141-459

TRANSCRIPT OF RECORD.

SUPREME COURT OF THE UNITED STATES.

OCTOBER TERM, 1890.

No. ~~968~~. 54

JOHN McCREARY, APPELLANT,

vs.

THE PENNSYLVANIA CANAL COMPANY.

APPEAL FROM THE CIRCUIT COURT OF THE UNITED STATES FOR THE EASTERN DISTRICT OF PENNSYLVANIA.

FILED MAY 26, 1888.

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OCTOBER TERM, 1890.

No. 368.

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JUDD & DETWEILER, PRINTERS, WASHINGTON, D. C., APRIL 6, 1891.

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1 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit.

JOHN MCCREARY
vs.
PENNSYLVANIA CANAL COMPANY. } No. 66. October Sess., 1873.

UNITED STATES OF AMERICA,
Eastern District of Pennsylvania, } *ss:*

Pleas and proceedings before the honorable the judges of the circuit court of the United States in and for the eastern district of Pennsylvania, in the third circuit.

It is thus contained:

Be it remembered that on the 14th day of January, A. D. 1874, the complainant, by his counsel, J. J. Coombs, Esquire, comes into court here and files his bill of complaint against the Pennsylvania Canal Company in the words and figures following, to wit:

2 Circuit Court of the United States for the Eastern District of Pennsylvania.

To the honorable the judges of the circuit court of the United States for the eastern district of Pennsylvania:

I. John McCreary, of Middletown, in the county of Dauphin and State of Pennsylvania, and a citizen of the State of Pennsylvania, brings this his bill against the "Pennsylvania Canal Company," a corporation existing under the laws of said State of Pennsylvania; and thereupon your orator complains and says:

II. That on or about the — day of ——, 1872, your orator, being the original and first inventor of certain new and useful improvements in devices for coupling and steering canal-boats not known or used by others before his invention thereof, and not for more than two years before that time in public use or on sale, made application, in due form of law, to the Commissioner of Patents of the United States, on behalf of himself and one Elijah McCreary, to whom he had assigned one undivided half of all his right, title, and interest in and to the said invention, for letters patent therefor, and, having fully complied with all the requisitions of the law in that behalf, such proceedings were had upon said application that on the 23d day of July, 1872, letters patent, in due form of law, were granted and issued to himself and the said Elijah McCreary for said invention, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior and countersigned by the Commissioner of Patents, bearing date the 23d day of July, 1872, and numbered 129,844, granting to your orator and the said Elijah McCreary, their executors, heirs, and assigns, for the term of
3 seventeen years, from the said 23d day of July, 1872, the exclusive right to make, use, and vend the said invention throughout the United States and the territories thereof, as speci-

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II. That on or about the — day of ——, 1872, your orator, being the original and first inventor of certain new and useful improvements in devices for coupling and steering canal-boats not known or used by others before his invention thereof, and not for more than two years before that time in public use or on sale, made application, in due form of law, to the Commissioner of Patents of the United States, on behalf of himself and one Elijah McCreary, to whom he had assigned one undivided half of all his right, title, and interest in and to the said invention, for letters patent therefor, and, having fully complied with all the requisitions of the law in that behalf, such proceedings were had upon said application that on the 23d day of July, 1872, letters patent, in due form of law, were granted and issued to himself and the said Elijah McCreary for said invention, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior and countersigned by the Commissioner of Patents, bearing date the 23d day of July, 1872, and numbered 129,844, granting to your orator and the said Elijah McCreary, their executors, heirs, and assigns, for the term of

3 seventeen years, from the said 23d day of July, 1872, the exclusive right to make, use, and vend the said invention throughout the United States and the territories thereof, as speci-

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II. That on or about the — day of ——, 1872, your orator, being the original and first inventor of certain new and useful improvements in devices for coupling and steering canal-boats not known or used by others before his invention thereof, and not for more than two years before that time in public use or on sale, made application, in due form of law, to the Commissioner of Patents of the United States, on behalf of himself and one Elijah McCreary, to whom he had assigned one undivided half of all his right, title, and interest in and to the said invention, for letters patent therefor, and, having fully complied with all the requisitions of the law in that behalf, such proceedings were had upon said application that on the 23d day of July, 1872, letters patent, in due form of law, were granted and issued to himself and the said Elijah McCreary for said invention, under the seal of the Patent Office of the United States, signed by the Secretary of the Interior and countersigned by the Commissioner of Patents, bearing date the 23d day of July, 1872, and numbered 129,844, granting to your orator and the said Elijah

3 McCreary, their executors, heirs, and assigns, for the term of seventeen years, from the said 23d day of July, 1872, the exclusive right to make, use, and vend the said invention throughout the United States and the territories thereof, as speci-

fied and set forth in said letters patent, now remaining on record in the Patent Office of the United States.

III. And your orator further represents and shows that your orator, with the assent of the said Elijah McCreary, having, for good and lawful cause, surrendered said letters patent to the Commissioner of Patents to be cancelled, and having duly applied for a reissue thereof upon an amended specification, and having complied with the acts of Congress in such case made and provided, and the said Elijah McCreary having reassigned to your orator, by an instrument in writing, duly recorded in the Patent Office of the United States, all his right, title, and interest in and to said invention and letters patent on the 28th day of October, 1873, the said letters patent were duly reissued to your orator in his own name and right, upon amended specification, for the residue of said term of seventeen years, said new and reissued letters patent bearing date the day and year last aforesaid and being numbered reissue No. 5630, the same being reissued in due form of law, under the seal of the Patent Office, signed by the Secretary of the Interior, and countersigned by the Commissioner of Patents, as by said letters patent or a duly certified copy thereof, in the court to be produced, will more fully appear.

IV. And your orator further represents and shows that said invention has been of great value and benefit, and that canal-boats coupled and steered in accordance therewith have been extensively used on the canals of Pennsylvania since the granting of said original letters patent and since the reissue thereof as aforesaid, and the rights of your orator thereunder have been generally respected and acquiesced in by the public, with the exception of the said defendant, and that your orator will realize large gains and
4 profits therefrom if infringements by the said defendants and their confederates shall be prevented.

V. Yet the said defendants, well knowing the premises and the rights secured to your orator as aforesaid, but contriving to injure your orator and to deprive him of the benefits and advantages which might and otherwise would accrue to him from the use and sale of said invention, after the said reissue and before the commencement of this suit, did, as your orator is informed and believes, without the license or co sent of your orator and against his will and in violation of his rights and in infringement of said letters patent, unlawfully and wrongfully use upon the canals of Pennsylvania large numbers of canal-boats coupled and steered in accordance with said invention and in infringement of said reissued letters patent, and did cause the same to be done, and do still continue to do the same, thereby depriving your orator of the profits of the said invention.

VI. And your orator further represents and shows that the aforesaid actings and doings of the defendants are all contrary to equity and in defiance of the rights secured to your orator as aforesaid, and to his great and irreparable loss and injury, and that by such acts and doings your orator has been and still is being deprived of great gains and profits which he might and otherwise would have ob-

tained, but which have been received and enjoyed by the said defendants by and through their unlawful acts and doings.

VII. And your orator further represents that what number of canal-boats coupled and steered in accordance with your orator's said invention have been used by the said defendant since the reissue of said letters patent to your orator and what profits the defendants have made from the use of the same he is unable to state, and he prays that the defendants may be compelled to discover and set forth the same.

5 VIII. And your orator further represents that he has caused notice to be given to the said defendants of the said infringements and of the rights of your orator in the premises, and requested the defendants to desist and refrain therefrom, and to account for and pay over to your orator the profits made by them by reason of the use of said invention secured by your orator as aforesaid.

IX. But now so it is, may it please your honors, that said defendants have combined and confederated with other persons to your orator unknown to resist and destroy the exclusive rights of your orator as aforesaid, and to make, use, and vend the invention secured to your orator as aforesaid without license of your orator and in violation of his rights in the premises, all of which is contrary to equity and good conscience and of great damage to your orator.

X. To the end, therefore, that the said defendants may, if they can, show why your orator should not have the relief herein prayed, and may full, true, and perfect answer make to all and singular the premises, and more especially may answer, discover, and set forth how many canal-boats coupled and steered in substantial accordance with the invention secured to your orator as aforesaid, or containing the said invention or any substantial and material part thereof, they have had in use since the said 28th day of October, 1873, and where and to what extent they have used the same, and that they may be decreed to account for and pay over to your orator all gains and profits realized from the unlawful use of said invention or any substantial and material part thereof, and such damages as may be adjudged and decreed to have been sustained by your orator by reason of the infringement of his rights under said letters patent by the defendants, and that the said defendants, their agents, attorneys, confederates, and workmen, may be restrained by an injunction, issuing out of and under the seal seal of this honor-

6 able court, from making, using, or vending the said improvements or any substantial or material part or parts thereof so secured to your orator as aforesaid.

XI. May it please your honors to grant unto your orator not only a writ of injunction, as herein prayed for, but also a writ or writs of subpœna, to be directed to the said Pennsylvania Canal Company, commanding the said company, at a certain time and under a certain penalty, to be and appear before your honors in this honorable court, and there to answer to this bill of complaint, and to do and receive what to your honors shall seem meet in the premises.

XII. And may it please your honors to grant to your orator not

only the relief herein and hereby specifically prayed for, but such other and further relief as may be according to equity; and your orator will ever pray, etc.

JOHN McCREARY.

J. J. COOMBS,
Counsel for Complainant.

UNITED STATES OF AMERICA, *Eastern District of Pennsylvania,* } ss:

On this fourteenth day of January, 1874, before me personally appeared John McCreary, the above-named complainant, who, being by me duly sworn, did depose and say that he has read the foregoing bill of complaint subscribed by him and knows the contents thereof, and that the same is true of his own knowledge, except as to matters therein stated on information and belief, and as to those matters he believes it to be true.

JOHN McCREARY.

Before me—
W. GRIER HIBLER,
U. S. Commissioner.

True copy.

SAMUEL BELL,
Clerk, etc.

7 (Endorsed:) 66. October sess., 1873. John McCreary *vs.* The Pa. Canal Co. Bill of complaint. Filed 14th Jan'y, 1874.

8 And afterwards, to wit, on the 17th day of August, A. D. 1875, the defendant, by its attorney, comes into court here and files its answer in the words and figures following, to wit:

In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, Sitting in Equity.

The answer of "The Pennsylvania Canal Company," a corporation existing under the laws of the State of Pennsylvania, to the bill of complaint of John McCreary, also a citizen of the said State.

The said defendant, answering, saith that it is informed and believes that letters patent of the United States No. 129,844 did issue, as charged in the bill, to John and Elijah McCreary, on the 23d day of July, 1872, for "an improvement in coupling and steering apparatus."

The defendant craves leave to refer to said letters patent when the same shall hereafter be produced in evidence, and avers that the device therein described is expressly declared in the specification of said letters patent to be an improvement on a pre-existing device, for which letters patent of the United States No. 125,684 had been granted on the 16th April, 1872, unto Elijah and John McCreary.

The defendant, further answering, saith that it is informed and believes, as in said bill is averred, that Elijah McCreary having assigned to John McCreary his interest in said letters patent No.

129,844, the same were by said John McCreary surrendered, and reissued letters patent of the United States—reissue No. 5630—were thereupon granted on the 23d day of October, 1873, unto the said John McCreary for the residue of the term granted in said original letters patent.

And, further answering, respondent saith that it is not informed, otherwise than by the general averment made by com-
9 plainant in his bill, that the device described by complainant in his said reissued letters patent No. 5630, or in the letters patent No. 129,844, whereof the same is a reissue, were ever reduced to practical use and employment, or that said devices are now used or ever have been used upon any line or canal in the United States; and this defendant denies expressly that said devices are used and employed upon its line of canal, and prays that all these averments of the bill, if deemed material by complainant, may be established by due and competent proofs; and this defendant denies expressly any and every averment of the bill whereby it is charged that defendant now infringes or at any time has infringed any of the rights secured to complainants by said reissue No. 5630 of original letters patent No. 129,844, or have so realized any benefits themselves or so deprived complainant of any rights, profits, or emoluments which he might otherwise have enjoyed or been entitled to.

And, further answering, defendant saith that the length of keel, breadth of beam, and depth of hold, and the consequent carrying capacity of canal-boats, is necessarily determined by the dimensions and the curvature of the prism of the canal in which such boats are used and operated; that the ingenuity of those conversant with the management and operating of canals has therefore very naturally been exercised in devising methods whereby greater carriage of cargo without a corresponding increase in the cost of transportation might be obtained; that is was manifest this could not be accomplished by an increase of length, beam, or depth of hold in the individual boat, since these elements were limited by the dimensions and curvature of the prism of the canal, and that hence the various devices whereby two or more boats might be connected with each other and used and operated by one crew and with one steering apparatus have come into existence. To effect this result it is manifestly necessary the two boats should be so united lengthwise with
10 each other that while their connection is secure it shall at the same time be readily flexible, so that the forward boat may be easily changed in its direction, forming different angles, more or less acute with the rear boat, the rear boat being in effect made to operate as a rudder in changing the direction of the forward boat.

Among the devices employed for effecting these results and for which at various times letters patent have been granted are:

1st. That of William H. Bartholomew, of England, to whom letters patent were issued in England, February 7th, 1862. The device of said Bartholomew was applicable to an indefinite number of boats, which, being placed lengthwise in a train, were adjusted to each other by causing the cut-water of each boat behind the first to fit into a vertical groove in the stern of its preceding boat, the

groove and the cut-water being so fitted to each other as to permit easy lateral movement; the boats were then held together and steered by an ordinary steering wheel placed on the rear boat and operating through lateral chains extending to and attached to the forward boat. Complainant was well aware of these devices, the same being mentioned and described in the original letters patent No. 125,684, granted by the United States, April 16th, 1872, to Elijah and John McCreary upon the devices in which said letters patent, those claimed by complainant in his said reissue No. 5630, are declared to be improvements.

2d. The devices described in letters patent of the United States No. 82614, issued September 29th, 1868, to Charles H. Frick, assignee of William Frick. The method devised by said Frick consisted in adjusting the boats to each other so that the bow of the rear boat, being made convex, fitted into a corresponding concavity in the stern of the forward boat, the convexity and concavity being prepared in an overhang of the decks of the two boats. The two boats were then united by a bar, so jointed as to be flexible, and to permit
11 the boats to have a vertical oscillation in riding the swells of the water, and a lateral oscillation or rolling motion from side to side, while at the same time the boats were by the bar kept sufficiently separate to permit the water to flow freely between them. The steering is effected by an ordinary wheel placed at the bow of the rear boat, the chain passing around pulleys secured in the deck and extending to the forward boat and unwinding from the axle of the steering wheel on the one side as it winds on the other. The defendant craves leave to refer to the said letters patent and the specification attached to the same, and to the model and drawings, on file in the Patent Office at Washington, all of which will be produced in evidence for a more exact description of the devices of said Frick.

3d. The devices described in letters patent of the United States No. 125,684, issued April 16th, 1872, to Elijah and John McCreary, for "improvements in steering devices for canal-boats," upon which devices those claimed by complainant in his said reissued letters patent No. 5630 are declared in said reissued letters to be improvements.

4th. The devices invented by Isaac J. Wister, the president of the corporation defendant, and for which letters patent of the United States No. 134,341 issued to said Isaac J. Wister December 24th, 1872, entitled letters patent for "improvements in coupling and steering tram-boats." In the device of said Wister the two boats are connected with each other by two chains which cross each other at the point of contact between the stem of the forward and the bow of the rear boat, at which point of contact a bearing block is adjusted upon each boat, the ends of the chain on one of the boats being made capable of slightly yielding by being attached to a block which presses against a spring inclosed in a box attached to the deck, in which the block is so arranged as to be capable of sliding, so far as the yielding spring, when pressed upon by the block, permits. The steering is effected by means of an ordinary wheel, so

adjusted that the movement of the wheel, according to its direction, causes the end of a long horizontal screw, which it operates, either to advance from or recede towards the wheel. To the ends of
12 this screw chains are attached, which, after passing around sheaves secured to the deck, extend to the forward boat, and there are attached to the deck in the same manner as the coupling chains before described are. Defendant craves leave, for a more particular description of this and of the other methods hereinbefore described, to refer to the models, drawings, and specifications which will be produced in evidence.

The defendant further saith that the mechanism and device employed on the canals owned, used, and operated by the defendant and the only mechanism of that nature or for such purposes there employed is that devised and invented by said Isaac J. Wister, and for which said letters patent of the United States, No. 134,341, were, on the 24th December, 1872, issued to said Wister, and that the device described in complainant's reissued letters patent No. 5630 is *is* not used upon any boat of defendant now or at any time employed upon said canal, and that the device secured to said Wister by his letters patent does not infringe upon any of the rights secured to complainant.

Defendant further saith that the boats used and employed upon said canal are not in fact used and operated by the defendant, but by parties who from time to time, upon stipulated terms, lease the same from defendant, as will be fully described in evidence hereafter given. Defendant further submits and insists that if complainant, by virtue of his said letters patent, is entitled to claim that he is an original inventor and entitled to any protection from his said letters patent, it is only for the exact combination of old and well-known devices described in the specification of his said reissued letters; that with reference to the first claim of said reissued letters, of a combination of two boats, a steering chain passing around sheaves secured to the deck, overhanging guards, and a chain securing the two boats together, that such a combination substantially exists in the specification of the letters patent of the United States issued to Frick September 29th, 1868, nearly four years before the date of complainant's letters patent, and that such combination, in
13 its several elements, is not used by defendant; that with reference to the second claim of said reissued letters of complainant, the same combination substantially exists in the devices patented by said Frick, and that it is not employed by defendant, the adjustible block sliding against a spring in a block secured to the deck differing wholly as an element in a combination from the clam-hook devised by complainant, the coupling chains and their mode of adjustment being wholly different, and the method of steering being also wholly different.

Wherefore defendant, denying any and all charges of infringement upon complainant's rights, and that complainant has any title

to relief, prays to be hence dismissed with his reasonable costs and charges in this behalf wrongfully expended.

Attest: I. J. WISTER, *President.* [SEAL.]

THEO. CUYLER,
Defendant's Solicitor.

Isaac J. Wister, being duly sworn according to law, doth depose and say that he is the president of the corporation defendant; that the statements made in the foregoing answer are just and true, to the best and utmost of his knowledge, information, and belief, and that the facts set forth in said answer, so far as made upon knowledge, are true, and so far as made upon information and belief of defendant or its officers are believed to be true.

ISAAC J. WISTER.

Sworn and subscribed before me August 17th, 1875.
[SEAL.] CHAS. P. CLARK,
U. S. Commissioner.

True copy.
SAMUEL BELL, *Clerk, etc.*

14 Endorsed: 66. C. C. U. S., Oct. sess., 1873. In equity. McCreary *vs.* The Pennsylvania Canal Company. Answer of defendant. Cuyler. Filed 17th August, 1875.

15 And afterwards, to wit, on the 19th day of August, A. D. 1875, the complainant, by his attorney, comes into court here and files his replication in the words and figures following, to wit:

16 Circuit Court of the United States for the Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } In Equity.

The replication of John McCreary, complainant, to the answer of the defendant.

This repliant, saving and reserving all and all manner of benefit and advantage of exception to the manifold insufficiencies of the said answer, for replication thereunto says that he will maintain, aver, and prove his said bill of complaint to be true, certain, and sufficient in law to be answered unto, and that the said answer of the said defendant is uncertain, insufficient, and untrue; without this, that any other matter or thing in the said answer con-
17 tained material or effectual in law to be replied unto, confessed or avoided, traversed or denied, is untrue; all which matters and things this repliant is ready to aver, maintain, and prove as this honorable court shall direct, and humbly prays as in and by his said bill he has already prayed.

J. J. COOMBS,
Sol'r for Compl'ts.

(Endorsed:) 66. October, 1873. John McCreary *vs.* The Pa. Canal Co. Replication. Filed 19th August, 1875.

18 And afterwards, to wit, on the 18th day of May, A. D. 1876, the defendants, by its attorney, comes into court here and files its supplemental answer in the words and figures following, to wit:

19 United States Circuit Court, Eastern District of Pennsylvania.
In Equity.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } No. 66. October Session, 1873.

The supplemental answer of The Pennsylvania Canal Company, defendant, to the bill of complaint of John McCreary, complainant.

This defendant, not waiving any but still insisting upon all and singular the matters and things set forth and averred in its original answer to said bill of complaint, for further answer thereto further says—

That it is informed and advised, and thereupon avers, that said complainant, John McCreary, was not the original and first inventor or discoverer of the thing patented or of any material and substantial part of the thing patented in and by the said reissued letters patent No. 5630, but that the same or substantially the same thing or the material and substantial parts of the thing so patented was or were, long prior to the supposed invention or discovery thereof by said McCreary, patented or described in letters patent of the United States granted or issued to the following-named patentees under the following dates, respectively, to wit:

No. 45039 to Eldridge Heath, November 15th, 1864.
No. 45720 to Walter Ingalls, January 3d, 1865.
No. 53088 to Stackpole, Spear & Cobb, March 6th, 1866.
No. 86737 to De Mesnil & Eyth, February 9th, 1869.

20 And in English letters patent issued to the following-named persons under the following dates, respectively, to wit:

No. 11044 to Peter Taylor, January 20th, 1846;
No. 1795 to John Bourne, June 26, 1857, and
No. 330 to Wm. H. Bartholomew, February 7th, 1862.

And this defendant, further answering, says that it is informed and advised and thereupon avers and will insist that said reissue No. 5630 is not for the same invention as said original letters patent No. 129,844, of which it is a reissue, as set forth in complainant's bill, but that, on the contrary, said reissue describes and claims more than was described or claimed in said original letters patent, and things other than and different from what was described in the specification or shown in the drawings of said original letters patent or indicated or suggested in said original specification or drawings, and this defendant thereupon submits and will insist that, by reason of changes and interpolations in the drawings and specification of said reissue No. 5630, the thing patented therein and thereby is sub-

stantially different from the thing patented in said original patent in said bill mentioned, and that said reissue No. 5630 is therefore null and void.

And this defendant, further answering, says that it is advised and believes and thereupon avers that the specification of said reissue No. 5630 does not describe or specify any patentable subject-matter, nor anything which, in view of the state of the art at the time of the supposed invention or discovery thereof by said McCreary, was a proper subject for letters patent of the United States.

Without this, that there is any other matter, cause, or thing in said bill of complaint contained material or necessary for this defendant to make answer unto and not herein and hereby or
21 in and by said original answer well and sufficiently answered, traversed, confessed, and avoided or denied true to the knowledge or belief of this defendant.

[CORPORATE SEAL.] THE PENNSYLVANIA CANAL COMPANY,
By I. J. WISTAR, *President.*

Attest:
A. MORDECAI, *Secretary.*
HENRY BALDWIN, JR.,
Solicitor and of Counsel for Defendant.

It is hereby stipulated and agreed that the foregoing supplemental answer shall be filed in said cause the same and with the same effect as if it had been filed at the same time with and as part of the original answer of defendant herein, but without prejudice to the state of the cause at this date.

J. J. COOMBS,
For Complainant.

Philadelphia, May 15th, 1876.

It is further stipulated that the complainant may, if he sees fit, after this meeting, take testimony-in-chief touching any of the issues raised by this supplemental answer.

HENRY BALDWIN, JR.,
For Defendant.

May 16th, 1876.

22 (Endorsed:) No. 66. October sess., 1873. U. S. C. court, E. D. Penna. In equity. John McCreary *vs.* The Pennsylvania Canal Company. Supplemental answer. Henry Baldwin, Jr., sol'r for defendant. Filed May 18, 1876.

23 In the Circuit Court of the United States for the Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } In Equity.

For complainant.

DISTRICT OF COLUMBIA,
County of Washington, } *ss:*

Be it remembered that at an examination of witnesses begun and held on the 10th day of Sept., A. D. 1875, and continued from time to time by adjournment, when the within depositions were taken, I, John J. Johnson, an examiner in chancery, did cause to be personally present at my office, No. 342 D street, in the city of Washington, in said District, the within-named witnesses to testify on the part and behalf of the complainant in a certain cause now depending in the supreme court of the District of Columbia, wherein John McCreary is complainant and The Penn. Canal Co. defendant.

J. J. JOHNSON.

24 In the Circuit Court of the United States for the Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } Equity.

Testimony in Behalf of Complainant.

WASHINGTON, D. C., *September* 10, 1875.

Met in pursuance to notice hereto, marked J, J, J, No. 1. and in conformity to exhibit hereto attached and marked J, J, J, No. 2.

Present: Counsel for either side; when JOHN MCCREARY, the plaintiff, was duly sworn and examined on the part of the plaintiff, who deposes and says as follows:

1 Q. State your name, age, residence, and occupation.

A. John McCreary; I am 45 years of age; I reside at Middletown, in the State of Pennsylvania; I am a boat-builder by occupation.

2 Q. Please give a brief history of all that you have ever done, either individually or in connection with any other person, in coupling canal-boats.

A. In the spring or summer of 1860 Thomas T. Wireman, chief engineer of the Pennsylvania Canal Company, asked of me and Elijah McCreary if we could devise and build a section boat to be steered and navigated and operated as a single boat steered by one man. We consulted and concluded we could. We told Mr.
25 Wireman if there was any inducement we could undertake the building of said boats. Mr. Wireman offered us half tolls for two years or one year toll free on the Pennsylvania canals, and would negotiate it at the same rates with Tide-Water and Wisco-

nisco. We went on and built the boats. The boats were accepted by Mr. Thomas T. Wireman and were boated for two years at half tolls. The locks not being doubled and adapted to that kind of boats on the Pennsylvania and Wisconisco canals, the boats were separated and not boated in that way afterwards.

3 Q. Did you have any written correspondence with Mr. Wireman on the subject?

A. Yes, sir; I herewith produce a letter, dated May 21st, 1850, and hereto attached and filed as Exhibit J, J, J, No. 3.

4 Q. Do you know the handwriting of Thomas T. Wireman?

A. I have received many letters from Mr. Wireman, and I believe that to be his handwriting.

5 Q. Did you ever receive any letter from any person connected with the Wisconisco canal on the same subject? If so, please produce it.

A. Yes, sir; I herewith produce this letter, dated at Millersburg, June 23d, 1860.

(The said letter is herewith filed and marked Exhibit J, J, J, No. 4.)

6 Q. Do you know what connection I. Miller had with this canal?

A. Isaac Miller was clerk or secretary of the Wisconisco Canal Company.

7 Q. Do you know the handwriting of Mr. Isaac Miller?

A. No, sir; I spoke to Mr. Miller in person in relation to this letter, and he said that Mr. Gratz had agreed on the abatement of tolls the same as the other companies.

(Defendant's counsel objects to these letters for incompetency and irrelevancy.)

8 Q. Please give a brief description of the coupled boats you have just been speaking of.

26 A. The boats were built on a cheap plan, with a concave stern post and convex stem-post, coming together and fitting closely, having a wooden windlass on rear boat that operated the chains running from rear to front boat through sheaves and returning and fastened on front boat.

9 Q. Did the convex stem post fit into the concave stern post from the top to the bottom of the boats?

A. They did fit from top to bottom closely.

10 Q. Can you produce a sketch illustrating the construction of said boats?

A. Yes, sir; I here produce one.

(The said sketch is hereto filed and marked Exhibit J, J, J, No. 5.)

11 Q. Please state what the letters on the sketch indicate.

A. A represents the convex stem post; B represents the concave stern post; C represents the sheaves; D represents the windlass; E represents the chains passing from windlass around sheaves; returns and fastens to front boat. The boat was built, I will say, ark-shaped, allowing the boats to curve.

12 Q. Were the stern and forward ends of the boats built vertical from the top to the bottom?

A. They were—or plumb. This boat, built after this sketch, was called "Experiment."

(Counsel for defendant objects to the introduction of Exhibit J, J, J, No. 5.)

13 Q. State the next thing you did in reference to coupling boats.

A. After building and boating of that boat, as per Exhibit J, J, J, No. 5, my brother and I concluded that when we got more means we would consult and advise and build a *a* pair of boats of a better constructed plan. In the spring of 1869 we devised two plans of boats. Mr. Thomas T. Wireman and A. J. Whitney, engineer and assistant engineer of the Pennsylvania canal, instructed us that they were going to double lock the locks of the Pennsylvania canal from Columbia to Wilks Barre for the coal-fields of Wyoming. By
27 that suggestion we built the boat of two plans that we had shown sketches of, allowing the least water space. The Pennsylvania Company did not alter their locks, as represented to us at that time. This boat was not well adapted to uncouple and lock singly.

14 Q. Please state what you refer to when you say this boat, describing the boat and the time when she was built.

A. We devised two plans in the spring and commenced building in the fall of 1869 a boat on the plan in this sketch now presented, and named the "Sixteenth Amendment."

(The said plan is herewith filed and marked Exhibit J, J, J, No. 6.)

(The defendant's counsel objects to the introduction of Exhibit J, J, J, No. 6.)

15 Q. Please state what the letters marked on this sketch indicate.

A. A represents the forward boat and B represents the rear boat. C represents steering windlass. D represents chain wheel. The steering wheel is connected with the chain wheeling by cog gearing. The four small *b's* represent the sheaves and *e* represents the chain.

16 Q. I see that the forward boat is built with a concave stern and the rear boat with a convex bow fitting into it. Please state whether or not said concave stern and convex bow fitted together from the top to the bottom of the boats.

A. The concave stern and convex bow came together and fitted closely from top to bottom.

17 Q. Did you ever build more than one pair of boats on this plan?

A. We did not, for the reason the boat was not well adapted to uncouple and run single. The boat coupled so closely it did not allow a rudder, and when uncoupled was unmanageable as to the forward boat. We boated this boat about two years and sold it to the Philadelphia and Reading Railroad Company.

18 Q. Now, please state what was the next boat you built and when you built it.

A. In the fall of 1870 we contracted with Hall Brothers &
28 Co., of Baltimore, to build four pair of double boats, which we completed in the spring of 1871, for which we applied for a patent, and received a patent dated April 16, 1872, No. 125,684. The boats built for Hall Brothers & Co., of Baltimore, were built in precise conformity with patent granted to us of April 16, 1872.

(A certified copy of said patent is herewith filed and marked Exhibit J, J, J, No. 7.)

19 Q. State whether, if you know, these boats are still in use. State what you knew on the subject.

A. These boats are still in use by Hall Brothers & Co., without any alteration, the same as when built. We since that date built seven pair of boats for the Philadelphia and Reading Railroad Company, used on Tide-Water and Susquehanna canal.

20 Q. Now, have you taken out any patent or patents for coupling and steering canal-boats since the issue of the patent last referred to?

A. I applied for and received patent for improvement in coupling apparatus for canal-boats July 23d, 1872, No. 129,844. The patent was issued to John McCreary and Elijah McCreary—to John McCreary as inventor, and to Elijah McCreary as assignee of one-half interest therein.

(The counsel for complainant now offers in evidence an uncertified copy of the specification and drawings of said patent.)

(Counsel for defendant waives authentication of this patent, reserving the right to object hereafter on showing that it is not a true copy of the specification and drawing of record in the Patent Office.)

(The said patent is herewith filed and marked Exhibit J, J, J, No. 8.)

21 Q. State whether patent last referred to was surrendered and reissued.

A. It was surrendered and reissued October 28, 1873, and No. 5630.

The complainant's counsel now offers in evidence an un-
29 certified copy of the specification and drawing, and the defendant's counsel waives authentication thereof, subject to the right to object to the same hereafter on showing that it is not a true copy of the specification and drawing of record in the Patent Office.

(The same is herewith filed and marked J, J, J, No. 9.)

22 Q. Do you know what kind of coupled boats have been in use by the Pennsylvania Canal Company since the date of said reissue? State the means of your knowledge on that subject.

A. I do see the boats nearly daily, when at home, and will present a model of the boats that the Pennsylvania Canal Company are using since the reissue of my patent.

(Model produced and marked J, J, J, No. 10.)

23 Q. Please state what opportunities you have had to observe the construction of the boats in use by the Pennsylvania Canal Company.

A. I am a boat-builder and contractor since 1850 and see the boats pass daily or nearly so when at home. I made this model in precise conformity to represent the boats as used by the Pennsylvania Canal Company, and this model is a precise representation.

24 Q. Do you know what number of boats of this description the Pennsylvania Canal Company is using?

A. I tried to ascertain the number during the boating season of 1874, and I could count to about the number of fifty pairs, which was a hundred boats, and they were still increasing their number by building boats of this description.

25 Q. Are you familiar with the patent issued to Isaac J. Wistar, dated December 24, 1872, No. 134,341?

A. I am. I got a copy out of the Patent Office of the patent issued to him (No. 134,341) and have examined it thoroughly at various times and often.

26 Q. I now hand you an uncertified copy of the specification and drawing of said patent, and ask you to point out wherein the boats actually in use by the said company, as represented by the model Exhibit J, J, J, No. 10, differs from the boats represented by the said drawing and described in said specification.

A. In I. J. Wistar's copy of the patent the cut-water of rear boat comes in contact with the stern post of the front boat and the coupling chains that run diagonally, crossing each other at the point where the boats come in contact, and he has got a spiral spring patented, represented by figure 2 in the drawing. In the boats actually used the stem or cut-water of the rear boat comes in contact with the overhanging guard or bumper on the rear end of the forward boat, the coupling chain or chains centering from the stem fastened to the rear end on stem or bumper of the forward boat to a claw or crow-foot. The chains for centering run to each side on the stern of forward boat and fastened to a crow-foot.

(Counsel for complainant herewith files Exhibit J, J, J, No. 11, subject to the same objection heretofore made by defendant's counsel.)

27 Q. Did you ever have any correspondence with Isaac J. Wistar, president of the Pennsylvania Canal Company, on the subject of procuring the right to use your inventions or either of them on their canal?

A. I had, and the General wrote me on various times. I now present three letters, dated October 25, 1871, December 13, 1871, and September 26, 1872.

(The said letters are herewith filed and marked Exhibits J, J, J, No. 12, J, J, J, No. 13, and J, J, J, No. 14.)

(The defendant's counsel objects to their introduction for irrelevancy.) (The envelopes to said letters are attached thereto.)

28 Q. Are you acquainted with the handwriting of Isaac J. Wistar?

A. I am; from letters received direct from him.

29 —. Did you ever converse with him on the subject of these letters, in which conversation the letters were referred to? If so, state the circumstances.

31 (Defendant's counsel objects on the ground of irrelevancy.)

A. I did. I went to Philadelphia on purpose, by request of General Wistar, to talk about those double boats and give him all the information relative to them; presented to him one model, and, if I mistake not, two models—one of the boats called the "Sixteenth Amendment" and one model of the boat made in accordance with patent No. 125,684, dated April 16, 1872.

Mr. I. J. Wistar had Mr. A. J. Whitney, assistant engineer, to give him the price for the coupling of fifty pair of boats with my coupling and steering device. I gave Mr. Whitney the price, $50, for a pair of boats, and the right to use my coupling on as many old boats as he might couple that season. I mean the price to be paid for the privilege of using the invention.

30 Q. Please explain what you mean by the price of putting the invention on fifty pair of boats and for the privilege of putting it on old boats.

A. Mr. Whitney consulted me, and asked me what price I would charge royalty on fifty pair of boats; that General Wistar requested him to get my price. I asked him $100 a pair as royalty. Mr. Whitney said, You had better put the price lower; that it will be the introduction of your patent, and the introduction will be worth more than the difference of price. Then I agreed to the price of $50. General Wistar replied that he would accept my offer and pay me $50 for fifty pair, and asked me if I would extend it also to all the old boats that he might couple during the season 1872.

31 Q. Did you answer the letter of General Wistar dated September 26, 1872; and, if so, have you a copy of your answer?

A. I did, and present the answer.

(The defendant's counsel objects to this copy of the answer because the original not having been accounted for.)

32 (The said letter herewith filed and marked Exhibit J, J, J, No. 15.)

32 Q. What has become of the original of that letter?

A. I mailed it to I. J. Wistar, Philadelphia.

(Complainant's counsel notifies counsel for defendant to produce said original if he objects to the copy now introduced.)

33 Q. Have you a model representing the invention described in your patent No. 129,844, dated July 22, 1872, and in the reissue thereof, No. 5630, dated October 28, 1873? And, if so, produce it.

A. I have, and here produce it.

(The same is marked and *and* filed as Exhibit J, J, J, No. 16.)

Examination-in-chief here closed.

Cross-examined by A. B. SHEARER, for defendant:

34 Q. Were not the boats coupled according to the plan marked J, J, J, No. 6, which you have said was unmanageable on account of the closeness of boats—useless, or nearly so, by reason of the fact that when the water in the canal surged and swelled the two far ends of the boats so coupled would, by reason of the great pressure brought upon the coupling, break them, no matter how strong they were made?

A. I had said the boats were unmanageable when uncoupled for the want of a rudder on the rear end of the forward boat. These boats were concave and convex to the width and depth of the entire boat, and these boats it did not matter what lateral position they were in, and therefore it did not require the chains to be tight as on these other boats.

35 Q. Still, did not that difficulty render boats joined by that plan practically useless?

A. Not with the amount of slackness you could allow the chains to have.

36 Q. Were not there other practical difficulties which
33 prevented the allowing of such a degree of slackness as you speak of?

A. There was none other only what I have already stated. When these boats were uncoupled they were unmanageable for the want of the rudder and towing on the bay. This boat was the lightest towing boat of any boat that is built, for the reason that the water once broke would tow about or near as light on the canal as the single boat with half the tonnage, but when uncoupled unmanageable for the want of a rudder. We being individuals and the companies getting their own boats, would not give us the loading unless going to places like Baltimore, towing on bay. This plan of boat is not adapted to uncouple or run separately as singly, and therefore I sold it to the Philadelphia & Reading Railroad Company.

37 Q. Mr. McCreary, has there ever been more than one pair of boats of that plan built and coupled, to your knowledge?

A. None other, to my knowledge. The Reading Railroad Company is using the only boats that I know of built and coupled in that way.

38 Q. On what canals are these boats that you built for Hall Brothers & Co., of Baltimore, now used?

A. On the Wisconisco, Pennsylvania, and Tide-Water canals, and Susquehanna. They have boated them, to my knowledge, from Millersburg, Pennsylvania, to Havre de Grace and Baltimore, and sometimes from Sunbury, Pennsylvania; further than that I have no knowledge. I am personally acquainted with John and Robert Hall. They both live in Baltimore. They have control of the Lykens Valley and Shamokin coal mines. The Philadelphia and Reading Railroad Company are still using the seven pair of boats built by us for them in accordance with patent No. 125,684. They are still boating from their coal chutes, Columbia, Pennsylvania.

No alteration has been made in these boats since they were built, to my knowledge.

39 Q. You say in 1874 you counted the number of boats and that they were running about the number of fifty pair, made in accordance with J, J, J, No. 10, and they were increasing the number of these boats by building. My simple question is, what knowledge have you that they were building after that plan?

34

A. By seeing the new boats passing our place. We can tell new boats and by asking the captains, and they would say they were just put on this spring, and we were satisfied that they were new boats on their first trips.

40 Q. Your place of business is close by the Pennsylvania canal, is it?

A. Our place of business is close by the canal, right upon the bank of it; for boat building and repairing.

41 Q. You are then in a position to see all the devices and plans for coupling and steering the canal-boats, that are made on the boats running on the Pennsylvania canal, and you have been for a number of years past?

A. I have been stationed, building and contracting for boats, on the banks of the Pennsylvania canal since the spring of 1850, and I think I have seen all the different coupling and steering devices used on the canal.

42 Q. Did you not, some years before the date of your patents, see in use upon the boats of that canal coupling and steering apparatus similar to those you have patented?

A. No; I never did; nothing similar to it. I would like to meet the man.

43 Q. Do you know a man named William Frick?

A. I do.

44 Q. Did you not see some devices or plans of his for coupling and steering boats prior to your application for your first patent?

A. Yes, sir; I saw his patent boat, with his steering rigging on it.

45 Q. Were not his devices similar to yours?

A. No, sir; I don't claim they were near mine.

46 Q. Do you know whether his devices were patented?

A. I know they were. I have a copy of his patent deeds.

47 Q. Mr. McCreary, when did you first conceive the idea of coupling or operating two or more boats together?

35

A. In the year 1860. After Mr. Thomas T. Wireman offered us the abatement of tolls my brother and I consulted and devised a plan that we built a pair of boats on that were accepted and run at half tolls for two years.

48 Q. What had you seen or known or heard of or read of similar devices for coupling and steering boats previous to that time?

A. I had never seen or read of any boat of that kind, nor heard of any boat of that kind steered, coupled, or operated with any mechanism before we built the pair in 1860.

49 Q. Who, then, invented the steering apparatus for coupling and steering for the boats built by you in 1860?

A. My brother and I; Elijah and John McCreary.

50 Q. Will you describe what part of that mechanism he invented and what part you invented?

A. We consulted and advised, and then we concluded it would answer, and we adopted the rig used, and I don't think one contributed more than the other.

51 Q. I see by referring to your specifications of letters patent No. 125,684 that you refer to devices for steering, &c., by William Hammond Bartholomew, of England. What did you know about Mr. Bartholomew's patent at the time you claimed you invented the device described in your specifications?

A. I didn't know anything of this English patent mentioned, but got my patent as model and specification is put into the office. When we came to get this patent the patent commissioner claimed it run against an English patent, and on examination the office found out that this didn't come in contact with the English patent, and granted me this patent as asked for.

52 Q. Mr. McCreary, do you mean to say that you knew nothing of Mr. Bartholomew's patent until you applied for your letters patent?

A. I did not.

36 53 Q. Never read any description of it, never heard any account given of it, and did not know of its existence?

A. I never heard any account of it, never read of any, never saw any, and never heard any spoken of.

54 Q. Now, Mr. McCreary, when did you discover the idea involved in the devices and mechanism patented in No. 125,684?

A. From the year 1860 my brother and I consulted at various times about building a boat of different construction, more improved, and mechanism for steering and coupling, and in the spring of 1869 we concluded that we had the thing accomplished. We made sketches and drawings, and had shown them to some few different persons that has given evidence in the case of interference on this patent between Elijah and John McCreary and William Frick. I showed them to John Kohr, of Middletown, Pa.; Warren J. McKinley, and I think there were others.

55 Q. Did you ever apply the mechanism and devices in the letters patent last referred to, No. 125,684, to canal-boats in actual use?

A. We put the same steering mechanism on the boat "Sixteenth Amendment," except the notch, in the spring of 1870. The boat was commenced in the fall of 1869 to build. That is the boat sold to the Philadelphia and Reading Railroad Company. In the fall of 1870 we contracted with Hall Brothers & Co. and completed four pair of boats with steering rigging in conformity to patent No. 125,684, and later built seven pair for the Philadelphia and Reading Railroad Company in precise conformity to patent No. 125,684. I had rigging made and gave it to M. A. J. Whitney, the assistant engineer of Pennsylvania Canal Company, as an experiment, at net cost, to be put on barge and steamboat, the steamboat shoving the

barge in front of steamboat. I can't give the date of it, but it has been in use more than a year.

Adjourned till to-morrow morning at 9.30 a. m.

J. J. JOHNSON, *Examiner.*

37 SATURDAY, *September* 11, 1875.

Counsel and witnesses met, pursuant to adjournment, by consent, at the office of J. J. Coombs, No. 639 F street, Washington, D. C.

Cross-examination of JOHN MCCREARY resumed:

56 Q. We have come down as far as the letters patent of 1872. What did you do next, if anything, in making improvements in devices for coupling and steering canal-boats?

A. In July, 1872, I received a patent for coupling and steering canal-boats of an improved plan, which patent is numbered 129,844 and is marked J, J, J, No. 8.

57 Q. Will you briefly state in what the improvement upon the former patent consisted?

A. It consists in coupling and centering from the stem or cut-water of front end of the rear boat with chains fastened in said stem or cut-water and running across to the stern or overhanging guard or bumper of the forward boat, and fastening at each *at each* adjacent quarter to claw or crow-foot, and bringing the boats in contract at the overhanging guard or bumper, thus doing away with the necessity of a notch in the overhanging guard of the forward boat.

58 Q. When did you first conceive the idea involved in this improvement?

A. In the spring or summer of 1869 or 1870.

59 Q. State what experiments you made of this improvement.

A. Not any; but having spoken to my brother if the invention first patented, April, 1872, was not a success we would then resort to this invention, patented July 23, 1872, No. 129,844.

60 Q. Do I understand you to say that you made no practical experiment of this improvement before you applied for and received letters patent No. 129,844?

A. Soon before or after we altered two boats of William Frick's patent, in which we used a part of this invention. The
38 sheaves were placed the same, and windlass and crow-foot or claws.

61 Q. Can you not tell whether this was before or after securing letters patent No. 129,844?

A. I can't fix the date; it was shortly before or afterwards.

62 Q. Who owned these boats and where were the boats when you did the work upon them?

A. John Vanhyning represented owning one pair. He — then living in York county; post office, Wrightsville, Penna. Andrew Fairman represented owning the other pair of boats; post office, Middletown, Penna; I think it is now Havre de Grace, Md. The boats were altered at Middletown, Penna.

63 Q. Name some persons who saw them there after you had done the work upon them.

A. I can't name persons outside of Captains Vanhyning and Fairman, already mentioned, except Warren J. McKinley and John Kohr, both of Middletown, Penna.

64 Q. After these boats which you have just spoken of were so altered as you described, they still had a notch in the stern of the forward boat and the cut-water of the rear boat fitting with it, did they not?

A. They did.

65 Q. The boats, then, thus altered, did not then present in their coupling and steering apparatus the exact combination claimed in letters patent No. 129,844?

A. They did not.

66 Q. Has there ever been built and used in practice a pair of boats coupled and steered in accordance with the combination of letters patent No. 129,844?

A. None of the entire invention of my construction.

67 Q. You never practically and successfully completed a combination of boats as per letters patent No. 129,844, have you?

A. Never fully.

39 68 Q. Have you the same answer in reference to the reissued letters patent No. 5630, dated October 28, 1873?

A. Yes, sir; the same answer.

69 Q. Do you know of such boats now in use?

A. The Pennsylvania Canal Company are using my coupling device described in patent No. 5630.

70 Q. But not your combinations, are they?

A. All, to my judgment, but the windlass; and they use only two sheaves.

71 Q. You stated yesterday that you and your brother Elijah advised together and together invented the devices for coupling and steering canal boats, patent April 16, 1872, No. 125,684. Did you not also advise together and together invent the improvements patented July 23, 1872, No. 129,844, for which you have a reissue, No. 5630, dated October 28, 1873?

A. Yes, sir; I wish to explain. I misunderstood the question. I thought he had reference to patent No. 125,684 when I answered Yes, sir. The patent No. 125,844 and the reissue are my own inventions, and if I have ever said otherwise I wish this answer to be a correction of what was said by me before.

72 Q. Did you communicate to any one, and, if so, to whom, the conception or idea involved in letters patent No. 129,844 and the reissue No. 5630 before you applied for the letters patent No. 129,844?

A. I did; to John Kohr and Warren J. McKinley, both of Middletown, Pennsylvania.

73 Q. To anybody else?

A. To my brother, Elijah McCreary.

74 Q. When in each case?

A. In 1869 or 1870.

75 Q. Can you tell about what time of the year?

A. In the summer.

76 Q. You stated yesterday, in your examination-in-chief, that you made sketches and drawings of the plan of boats according to which you afterwards built the "Sixteenth Amendment," exhibit lettered J, J, J, No. 6. Please name other persons besides Kohr and McKinley to whom you showed these sketches and drawings.

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A. I don't remember of any others to whom I showed them, yet there may have been others.

77 Q. You stated yesterday that you completed this boat called the "Sixteenth Amendment" in the spring of 1870. Please state exactly what time in the spring of 1870 you completed this boat.

A. I can't tell exactly; too long a time has since elapsed.

78 Q. You stated yesterday that the Pennsylvania Canal Company negotiated with you for your price for couplying fifty pairs of boats, and that you gave them, after some negotiation, your price at $50.00 per pair. Did the Pennsylvania Canal Company accept your terms?

A. They agreed to give me the price of $50.00 per pair, but failed to do so.

79 Q. In other words, you did not put your couplings upon their boats, did you?

A. The price of $50.00 was to be the royalty, and I was not to put the invention upon the boats.

80 Q. The company, then, did not avail themselves of the terms you offered them, did they?

A. The company went to work and used my invention and gave me nothing.

81 Q. And it is for this alleged grievance that you have brought this suit, is it?

A. Yes, sir; as for infringing.

82 Q. You said yesterday that you and your brother in the spring of 1869 devised two plans for coupling and steering canal-boats, and in the fall of 1869 you commenced to build a boat called the "Sixteenth Amendment" after one of the plans. What was the other plan to which you referred?

A. One was the "Sixteenth Amendment" and the other was such as is built for Hall Brothers & Co., of Baltimore, Maryland.

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83 Q. Did not the other plan include the improvements patented in letters patent No. 129,844?

A. I would say it did not. I claim No. 129,844 as an improvement.

84 Q. Where were you born, and where did you spend your time prior to 1850?

A. In York county, Pennsylvania; came to Middletown in 1836, and have lived there ever since; drove a boat horse and boated and worked at boat-building up to 1850.

Adjourned to meet at the office of Mr. Coombs on Tuesday, September 14th, 1875, at 10 o'clock a. m.

TUESDAY, *September* 14, 1875.

Met pursuant to agreement.
Present: Counsel on both sides.

Continuation of cross-examination of Mr. MCCREARY by Mr. SHEARER:

85 —. In your examination-in-chief you said that you and your brother together constructed a pair of boats, represented by Exhibit J, J, J, No. 5, in the year 1860; that after boating them two years they were separated and never afterwards boated together as a pair. Will you please state where these separate boats can be seen?

A. The likelihood is that these boats have been torn to pieces for some years.

86 Q. Can you name any person or persons who saw these boats and knew their construction?

A. John Emerich, now in one of the Western States; Jacob Allbright, who is dead. These men together ran these boats. Warren J. McKinley, boat-builder, Middletown, Pa., and Abraham Collins, Manilla, Pa.

87 Q. What was the defect in the pairing of these two boats that caused you to discontinue their use as a pair?

A. The locks were single, and not adapted to a double boat on the main line of the Pennsylvania canal. My brother and
42 I sold the boats to Emerich and Allbright. They afterwards sold an interest to Mr. Collins.

88 Q. The locks of the canal having been doubled by lengthening, would pairs of boats coupled after the plan of J, J, J, No. 5, be used with facility and advantage on the Pennsylvania canals?

A. Our present boats and patents are a much improved boat, whilst the first pair was temporary, only calculated to last about the time of the two years at half tolls, and would consider it a poor excuse of a boat.

89 Q. Question repeated.

A. No, sir.

90 Q. Why not?

A. The bulk-heads running from the top plum- to bottom made them hard towing, unsafe, on account of their not allowing any protection when uncoupled and not allowing any place for rudder. The stem post was convex and the stern post was concave where they came together, and fit closely from top to bottom.

91 Q. What necessity is there for separating boats upon the canals with locks as now constructed?

A. There would be none now, only where locks are single and towing on bay. At Columbia and Hog-Pen locks—there are others up the main line of the Pennsylvania canal that I cannot name—and the locks of the Wisconisco canal are single, now owned by the Pennsylvania Canal Company.

92 Q. Could not a rudder be attached by the side of the stern post of the forward boat?

A. There might be; but the boats could not be coupled with the rudder being there; there is no room.

Redirect-examination by Mr. COOMBS:

93 Q. When you were negotiating with Mr. Whitney with respect to the use of your invention or inventions by the Pennsylvania Canal Company was he aware that you had obtained letters patent No. 129,844, dated July 23, 1872?

A. He was. I told him that I had an improved inven-
43 tion, and he asked me that if at the price if I would include the entire invention of my patents. I said I would.

94 Q. At what time was this interview with Mr. Whitney that you have been speaking of?

A. Some time in September, 1872, shortly before receiving a reply from General I. J. Wistar. Reference is made to Exhibit J, J, J, No. 13.

95 Q. In your cross-examination last Saturday you stated in substance that the Pennsylvania Canal Company were using all of your combination, except that they used a screw instead of your windlass, and only two sheaves. Will you please state what is the function performed by your windlass and sheaves, as shown in your patent?

A. The functions are those of increasing the power of the steersman.

96 Q. What is the function performed by the screw and nut as used on the boats of the defendant?

A. The same.

97 Q. State whether or not the windlass and pulleys and the screw and nut are well-known mechanical powers for increasing power at the expense of motion.

A. They always have been, to my knowledge.

(Recross-examination by Mr. SHEARER:)

98 Q. The windlass and pulleys are different mechanical contrivances from the screw and wheel with the screw nut in it, are they not?

A. Different contrivances, but perform the same functions.

JOHN McCREARY.

JAMES M. BLANCHARD, a witness of lawful age, being first duly sworn, and examined by Mr. COOMBS, on behalf of the plaintiff, deposes and says:

99 Q. What is your name, age, residence, and occupation?

A. James M. Blanchard; reside at 217 M street, Washington, D.C.; present occupation, solicitor of patents; age, 57 years.

100 Q. Please state briefly what experience you have had
44 as a machinist or engineer and as an examiner of inventions and patents and as a mechanical expert.

A. When 17 years of age I was apprenticed to the machinist business. After having served out my time I was for several years engaged as a journeyman machinist in the construction of millwork, steam-engines, and general machinery, after which I was employed for about fifteen years as locomotive engineer and as

master machinist of a railroad, and afterwards carried on a shop in which I manufactured locomotives, stationary engines, and machinists' tools. Leaving this business, I was employed as superintendent of the Cincinnati and Chicago railroad, and afterwards as traveling agent of the Ames Iron Company, Falls Village, Connecticut, which business I left to come to the United States Patent Office as an examiner of applications for patents. This last position I occupied for about eight and a half years, during most of which time I had charge as principal examiner of the classes of steam-engines, hydraulics, hydrostatics, and pneumatics. I left the Patent Office to engage in the business of soliciting patents the 1st of July, 1868. As an expert in patent cases, referring to mechanical devices, I have had considerable experience, having been thus employed in several cases in this city and in Cincinnati, Buffalo, New York, and in Boston and Cleveland.

101 Q. Please examine specification and drawing of reissued patent No. 5630, dated October 28, 1873, to John McCreary, being Exhibit J, J, J, No. 9, in this case, and state whether you understand the specification and drawings.

A. I have examined the specifications and drawings, and believe that I understand them.

102 Q. Please examine model now shown you of a pair of coupled boats, marked Exhibit J, J, J, No. 10, and state whether, in your opinion, boats constructed, coupled, and steered in accordance with this model would infringe said reissued patent No. 5630, giving your reasons for your opinion.

45 A. I have examined the model referred to in the last question, and believe that boats constructed, coupled, and steered in the manner represented in said model would infringe reissued patent No. 5630, dated October 28, 1873. I find the object of both patents to be the construction of boats and their coupling and steering mechanism in such a manner that the two can be held in contact or nearly in contact with each other when in use. To enable this result to be produced I find that in each case the bow or a projection therefrom is made to bear against or to come very nearly in contact with the stern of the other. For holding the boats in this relative position I find that each one is supplied with a chain fastened at its ends to points upon the overhanging rear end of the forward boat, from which point it extends to and is connected with the stem post upon the bow of the rear boat. For steering the boats I find that each has a chain attached to points upon the deck and near the stern of the forward boat. From these points of attachment said chains extend rearwards to and around sheaves or pulleys secured to the deck of the rear boat and near the bow thereof. From the sheaves or pulleys above referred to the chains extend to and are connected with the mechanism, which gives motion to said chains, as a consequence of which motion the operator is enabled to give the desired direction to the boats. In the model referred to the devices employed for giving motion to the steering chains are a screw, nut, and a steering wheel. These last named devices are arranged transversely across the boat in

order that the chains may be attached directly to the ends of the screw and so allowed to pass around the sheaves previously referred to and then forward to the points of attachment in the forward boat. In the reissued patent No. 5630 I find a chain, one end of which is attached to the rear end of the forward boat, from which point it passes to and around a sheave or pulley upon the deck and near the bow of the rear boat, and thence forward to and around a similar sheave or pulley upon the deck and near the stern of
46 the forward boat, and from said pulley or sheave to a guide sheave on the rear boat, which conducts it to the barrel of a windlass, around which it passes, and from this point the chain extends to and around a similar set of sheaves or pulleys, its opposite end being fastened to the deck of the forward boat at a point opposite the point of beginning. The device for giving motion to the chain in this case consists of a windlass, having upon it a wheel for rotating the barrel around which the chain passes. I further find that the function to be performed in both cases is the movement of the chain or chains by which the boats are steered, and hence I believe that the mechanism employed to impart such movement as represented upon the model marked J, J, J, No. 10, is only an equivalent of that shown and described in reissued patent No. 5630. In reference to the means employed for connecting the two boats together, I find that they are alike in all essential particulars, both employing a chain attached to the forward boat and passing around a stem or post rising from the bow of the rear boat previously described. In relation to the construction of the overhanging guard upon the forward boat and the cut-water or narrow projection upon the bow of the rear boat, I am unable to distinguish any essential difference between the two, both being designed to hold the boats in certain position with reference to each other, both performing that function in the same manner and to the same extent. I therefore find two boats, A and B, and a steering chain passing around sheaves or pulleys and around a windlass (or what, in my judgment, is only an equivalent therefor), an overhanging guard or bumper on the stem of the forward boat, and the chain D or its equivalent attached to opposite points on the stern of said boat and to the stem or central part of the bow of the rear boat, so as to form a universal joint between them and keep them coupled and centered. All of the above features I find embodied in the model marked J, J, J, No. 10, and under such an arrange-
47 ment as to cause them to perform all of the functions performed by corresponding devices shown and described in reissued patent No. 5630.

103 Q. Please state what you understand to be the office of the system of sheaves or pulleys shown in said reissued patent No. 5630.

A. I understand it to be the increase of power which may be applied to the rotating of the windlass in steering the boats.

104 Q. Please state whether you find any device for performing the same function in J, J, J, No. 10; and, if so, what device?

A. I do find such a device, which consists of a screw and a lever, the wheel in this case serving the purpose of such lever.

105 Q. Where do you find the nut through which the screw works?

A. I find it formed upon the interior of the hub of the wheel through which the screw passes; as a consequence of which when the wheel is turned the screw is moved, and so operates upon the steering chains.

106 Q. Please state whether or not the windlass and pulleys and the screw and nut are well-known mechanical powers, familiar to all mechanics, for increasing power at the expense of motion; and, if so, how long, to the best of your knowledge and information, they have thus been known.

A. They are both well-known mechanical powers for producing an increase of power in the manner described in the question. As to how long they have been thus known I am unable to say with any degree of exactness, but certainly for a great number of years.

107 Q. As you find these two powers used in the invention described in said reissued patent No. 5630 and shown in said model J, J, J, No. 10, please state whether or not you regard them as well-known equivalents for effecting the same object.

A. I do regard them as such well-known equivalents in all places where it is possible for the parties interested to make a se-
48 lection, as, for instance, in raising heavy weights or in moving heavy bodies horizontally.

108 Q. I now call your attention to the second claim of said reissued patent No. 5630 and ask you, do you find in said model J, J, J, No. 10, the devices covered by said claim, giving your reasons therefor?

A. I do find the device there claimed, and I further find that it is used for the same purpose. My reasons for coming to this conclusion are that the device consists in a claw-hook, as described in the specification, the office of which is to receive and hold the ends of the chains upon the deck of the forward boat, and to provide a ready means of attaching and detaching said chains.

I further find that these devices are found in the same combination and relation to the other parts of the boats as that in which they appear in reissued patent No. 5630.

109 Q. Please examine specification and drawing of letters patent No. 134,341, dated December 24, 1872, issued to Isaac J. Wistar, which is marked J, J, J, No. 11, as an exhibit in this case, and state whether or not said model J, J, J, No. 10, differs in any respect from the invention described in the specification of said patent and shown in the drawings thereof; and, if so, in what respects.

A. I have examined specification and drawings referred to in the last question and have compared the same with the model referred to and find that the drawing shows two boats coupled together and having a narrow-faced projection upon each, said projections being shown as in contact and, for aught that appears to the contrary, they are intended to be in contact throughout their entire length, vertically. I am led to believe that this was the intention of the inventor

by what I find in the specification, which reads as follows: "I attain the first object by coupling chains *a a'*, secured to the adjacent boats B B' and crossing each other as shown in the plan view, figure 1 of the accompanying drawing, so that while the stern post of one boat is maintained in contact with and in the proper
49 lateral position in respect to the cut-water of the other boat by the cross-chains the latter will permit the boats to assume different angles in respect to each other."

110 Q. If you reverse the two sections of model J, J, J, No. 10—that is to say, turn them end for end—how would the manner of their contact correspond with, or differ from, the representations shown in the drawing of Wistar's patent?

Question objected to by defendant's counsel for that the model Exhibit J, J, J, No. 10, was introduced in evidence by plaintiff's counsel in order to show the construction of the boats in actual use by the Pennsylvania Canal Company, and not as a model made in accordance with the specifications and drawings of Wistar's letters patent No. 134,341.

Plaintiff's counsel answers, it is true that said model was introduced for the purpose of showing the kind of coupled boats used by the Pennsylvania Canal Company, and he now offers the testimony objected to to contradict that part of defendant's answer which alleges "that the mechanism and devices employed on the canals owned, used, and operated by the defendant, and the only mechanism of that nature or for such purposes there employed, is that devised and invented by said Isaac J. Wistar, and for which said letters patent of the United States No. 134,341 were, on 24th December, 1872, issued to said Wistar; and that the device described in complainant's reissued letters patent No. 5630 is not used upon any boat of defendant's now or at any time employed upon said canal."

Defendant's counsel replies that an answer to the question objected to would not tend to the purpose expressed by plaintiff's counsel.

A. It would correspond exactly with the drawing shown in Wistar's case, and also with that portion of the specification above quoted. The drawing forming a part of Wistar's patent No. 134,341 shows two boats coupled together, each having the same form at the coupled ends, with the single exception that the stem or cut-
50 water of one has a slightly narrower face or surface than that of the other. By reversing the sections in the model as suggested in the question I find that the parts in contact and those adjacent thereto correspond very nearly, if not exactly, with the drawing accompanying the patent, and this leads me to the conclusion that the original intention of the inventor was to have them thus placed.

111 Q. If the two boats were brought together and coupled as represented in Wistar's specification and drawiug, would there be an universal joint between them?

A. There would not, for the reason that when it became necessary for the two inner ends of the boats to rise above the level of their

other ends, the coupling chain would prevent such rise and preclude the posibility of such movement without breaking the chains or some of the parts to which they were fastened, and hence it could not be called an universal joint.

112 Q. In a pair of boats constructed, brought together, and coupled in accordance with said model J, J, J, No. 10, is there an universal joint between the two boats; and, if so, what device do you find that enables the coupled ends of the boats to rise?

A. There is an universal joint when the boats are coupled as suggested in the last question, when that term is used in the sense in which it is employed in Mr. McCreary's reissued specification No. 5630. The devices employed and shown in model J, J, J, No. 10, for allowing the inner ends of the boats to rise are, first, an overhanging deck or platform attached to the forward boat, projecting rearwards therefrom; and, secondly, a projecting post or cut-water upon the extreme forward end of the rear boat, these parts being so arranged, owing to the small depth or vertical surface of the overhanging platform, that while it is in contact with the projection upon the rear boat the inner ends of the two boats can rise above the level of their other ends without causing any undue strain to be put upon the coupling chain.

51 113 Q. In a pair of boats constructed, brought together, and coupled in accordance with the specification and drawings of Wistar's patent, would it be practicable to apply a rudder to the forward boat?

A. It would not; because the two projecting parts would be in contact throughout their entire vertical length, and so would preclude the possibility of applying a rudder to the forward boat.

114 Q. Please state whether or not you discover any difference in the coupling chains which hold the two boats together, between the drawings and specifications of Wistar's patent and said model J, J, J, No. 10.

A. I do discover a difference. The chains represented in the drawing are two in number, one end of each being secured to the rear end of the forward boat, while their opposite ends are secured to the forward part of the rear boat, they crossing each other at or near the point where the two boats come in contact. In the model referred to, there is a single chain, both ends of which are attached to the forward boat, while its central portion is made to pass around the stem or cut-water of the rear boat.

115 Q. If two boats are constructed, brought together, and coupled in accordance with Wistar's specification and drawings, would they remain centered in making a turn?

A. I don't think they would; for that the surfaces in contact are so narrow that when the forward end of the forward boat or the rear end of the rear boat are very much deflected from a straight line that portion of the rear boat which comes in contact with the forward boat would be carried to one side of the projecting surface thereby, and so allowed to pass it, which movement would have the effect to change the centres of the two boats to such an extent as to allow the rear boat, in cases where the forward one was meeting

with any unusual resistance, to press against the side of the forward boat and thus throw them still farther out of the central line.

116 Q. If the boats were constructed, brought together,
52 and coupled in accordance with the model J, J, J, No. 10, would they remain centered in turning a curve?

A. I see no reason why they should not. The model shows the overhanging deck or platform as being made on a circle as large in diameter as the width of the boat, and this leaves the point upon which the rear boat bears against it of such form as to cause the chains to prevent the rear boat from passing any considerable distance to the one side or the other of the centre of the forward boat.

117 Q. What difference, if any, do you see between model J, J, J, No. 10, and the boats shown and described in McCreary's reissued patent No. 5630 in respect to forming an universal joint between them and keeping them coupled and centered?

A. I don't see any. The devices employed are substantially, not to say identically, the same in both cases, and are so combined and arranged as to make their functions the same.

118 Q. Please examine model shown you and marked J, J, J, No. 16, as an exhibit in this case and state whether or not it corresponds with the specifications and drawings of McCreary's reissued patent No. 5630.

A. I have examined model Exhibit J, J, J, No. 16, and compared it with the drawings and specification of reissued patent No. 5630 and find that it corresponds fully with the specification of said reissued patent and with the drawing in all respects except that, owing to the fact that said drawing represents a plan view of the boats and their coupling and steering mechanism, the "overhanging guard H" is not shown therein, but is fully described in the specification.

Adjourned to meet at the office of J. J. Coombs September 15, 1875, at 10 o'clock a. m.

53 SEPTEMBER 15, 1875.

Met pursuant to agreement.

Present: The counsel on both sides and the witnesses.

Cross-examination of Mr. BLANCHARD by Mr. SHEARER:

119 Q. You stated yesterday, that after serving your apprenticeship at the machinist business you worked as journeyman machinist, constructing mill-works, steam-engines, and general machinery; please state where and how long you were so employed.

A. My first employment after leaving the shops where I served my apprenticeship was in Claremont, N. H., upon gun-work. I can't say how long I stayed there; possibly six months. From there I went to Rochester, N. Y., where I entered into copartnership for the purpose of building mill-work, woolen machinery, and steam-engines. After having carried on the business for about two years my shop was burned; we dissolved the partnership; after which I was employed by one Martin Riggs as a journeyman machinist, in

the city of Rochester, N. Y., from which place I went to the shops of the Tonawanda Railroad Company, at Rochester, N. Y., where I remained about two years.

120 Q. Also, in reference to the testimony given by you yesterday, please state upon what railroad you were locomotive engineer and master mechanic, and how long you acted in the latter capacity.

A. My first experience as locomotive engineer was upon the Attica and Buffalo railroad, commencing in 1844, where I remained about three (3) years; after which I was employed in the same capacity upon the Buffalo and Niagara Falls railroad, for about two years, from which I went to Springfield, Mass., where I acted in the capacity of locomotive engineer upon the Western railroad for about three years, leaving this position for that of master machinist of the Seaboard and Roanoke railroad, in Virginia and North Carolina, where I remained about four years. I omitted to state that upon leaving the Buffalo and Niagara Falls railroad I went to the
54 Utica and Schenectady railroad as locomotive engineer, where I remained about two and a half years, and from which place I went to the Western railroad, in Springfield, Mass., as previously stated.

121 Q. Also where and how long you carried on a shop in which you manufactured locomotives, stationary engines, and machinists' tools?

A. Springfield, Massachusetts, and for about four years.

122 Q. What had you to do with machinery when employed by the Cincinnati and Chicago Railroad Company, and I ask the same question as to the Ames Iron Works?

A. My position with the Cincinnati and Chicago Railroad Company was that of general superintendent, in which capacity I had charge of all the machinery upon the line, whether locomotive or stationary. While with the Ames Iron Company I had very little to do with the machinery of the works, but was often consulted as to the best methods of constructing machinery for the manufacture of locomotive car axles, steamboat shafting, &c.

123 Q. How many of the eight and a half years did you have charge, as principal examiner, of the classes of inventions named by you yesterday?

A. About eight years. I entered the Patent Office in April, 1861, as first assistant examiner in the class of metallurgy, in which position I remained until July of same year, when I was promoted to the position of principal examiner of the classes above mentioned.

124 Q. When in your examination-in-chief you said you have had considerable experience as an expert in patent cases referring to mechanical devices you mean, do you not, that you had testified as a witness in cases mentioned by you?

A. I mean that I have testified as an expert witness.

125 Q. Have you ever had any practical experience in the management of boats of any kind—of vessels on canal or other waters?

A. Never have. I have, however, built, put in operation,
55 and run an engine on a ferry-boat, but had nothing to do with the general management of the boat.

126 Q. Have you seen and examined the several specifications and drawings and the several models in reference to which you have been examined in chief before your examination began; and, if so, when and where?

A. I had seen them and to some extent examined them, previous to the commencement of this examination, in the office of Mr. J. J. Coombs, in Washington, D. C., about a week since.

127 Q. Now, let us pass to Exhibit J, J, J, No. 10, and to McCreary's reissued patent No. 5630, and first please state what, in your judgment, constitutes a mechanical equivalent.

A. In my judgment, any device which in its operation is substantially the same as another, it performing the same function in substantially the same manner, is the equivalent of any other device when used for the same purpose.

128 Q. Would you call one piece of fire-arms capable of sending a ball a certain distance and with a certain degree of accuracy a mechanical equivalent of another piece of fire-arms very differently contrived, but capable of sending a ball the same distance and with the same degree of accuracy?

A. As a fire-arm, broadly considered, I should; because, so far as I am aware, it is the result produced by the same that is to govern in making up an estimate of the similarity or dissimilarity of the two devices. When considered as mechanical devices only, and without reference to the particular use to which they were to be applied or combinations in which they might be found, I think they would not necessarily be regarded as in all respects equivalents of each other.

129 Q. It is, then, in your opinion, the functions to be performed that determines whether or not the mechanical devices are equivalents—that is, if the functions performed are the same, the mechanical devices are equivalents?

56 A. It does not follow nor do I wish to be understood as saying that in all cases the function performed determines the equivalency of the devices, as it is well known that devices differing essentially in form may be made to perform functions like those performed by differently constructed devices; but when a certain function is to be performed and well-known devices are used for the production of the results arrived at, such devices as are known to be capable of producing the same results when used in the same relation to each other and for the same purpose may, I think, fairly be called equivalents of each other.

130 Q. Are not the screw and nut different mechanical powers from the windlass, irrespective of the functions to be performed in any given case?

A. When considered as mechanical powers, as laid down in the books, the screw, properly speaking, may be regarded as one of the mechanical powers. The windlass cannot be so regarded. In this case they are both used as a means of transmitting the power applied to the wheel and may be regarded, when taken separately, as different mechanical devices.

131 Q. You stated yesterday in your examination-in-chief that the effect of the system of sheaves or pulleys shown in McCreary's

reissued patent No. 5630 was the increase of power to be applied to the rotating of the windlass and the steering of the boats, and that the device for accomplishing the same object in model J, J, J, No. 10, consists of a screw and lever—that is, the wheel in this case serving the purpose of a lever. You mean, in other words, to state, do you not, that the power which is gained by the system of pulleys in McCreary's patent No. 5630 is gained in the case of the model J, J, J, No. 10, by the screw, nut, and the wheel?

A. I do.

132 Q. Then I understand you to say the power which in McCreary's patent resides in the system of pulleys resides in the case of this model J, J, J, No. 10, in the screw, nut, and wheel; do I not?

57 A. I do not understand that any power "resides" in the system of pulleys in the McCreary case or in the screw, nut, and wheel in the case shown in model J, J, J, No. 10, but that both are used as a means of giving motion to the other parts of the mechanism, the power necessary to produce such motion "residing" in the person operating the mechanism, such power being communicated through the wheel in both cases.

133 Q. A given power being applied to the wheel of model J, J, J, No. 10, and to the windlass in McCreary's patent No. 5630, will not the same result be produced in the case of the model and in the case of McCreary's arrangement of a system of pulleys?

A. Assuming, as I do, that the result to be accomplished is the movement of the chain or chains for the purpose of giving motion to the rudder, I have no hesitancy in saying "that the same result will be produced."

134 Q. If, then, in the case of the model J, J, J, No. 10, this result will be produced without the system of pulleys found in McCreary's patent, how can you say that the screw, nut, and wheel which supplies the power supplied in McCreary's patent by the system of pulleys is an equivalent of the windlass?

A. I am not aware that I have at any time or in any place stated "that the screw, nut, and wheel which supplies the power supplied in McCreary's patent by his system of pulleys is an equivalent of the windlass."

135 Q. I now call your attention to the claw-hooks represented upon the model J, J, J, No. 10, and ask you if in structure they are the same as those shown in the drawing, figure 2, of McCreary's reissued patent No. 5630.

A. That part of the claw-hook shown upon said model to which the chain is attached appears to be identical in form with that shown in McCreary's reissued patent No. 5630. There is, however, added to the claw-hook shown upon the model a shank,

58 which passes through a piece of gum, which acts as a spring, which last feature is not shown in the drawing in McCreary's case.

136 Q. As a practical machinist of long experience, is not the screw, nut, and wheel, with the single chains passing around guide sheaves or pulleys and connected with the forward boat in the

manner shown in the model J, J, J, No. 10, a much simpler and more effective method of steering coupled boats than by the complicated system of pulleys and chains shown and described in specification and drawing, figure 1, of McCreary's reissued letters patent No. 5630?

A. If the words "much simpler" refer to the number of pieces employed, I have to say that the device shown in model J, J, J, No. 10, is simpler than that shown in the McCreary case; but if it relates to cost of construction, then I do not think that it is simpler. As to its efficiency, I don't regard it as equal to the device shown in the McCreary case.

Redirect examination by Mr. COOMBS:

137 Q. In answer to a cross-interrogatory you speak of the result to be accomplished in the case of McCreary's patent by the windlass and system of pulleys and in model J, J, J, No. 10, by the screw and wheel as being the "movement of the chain or chains for the purpose of giving motion to the rudder." Is that the only function performed by the windlass and pulleys in the one case and the screw and wheel in the other; and, if not, what other function is performed by these devices besides the movement of the chain or chains for the purpose of giving motion to the rudder?

A. In answer to the cross-interrogatory referred to in the question, I have to say that I inadvertently used the word "rudder" when I should have used the words "forward boat," so as to change its direction. This is not the only function performed by the devices referred to in the question to which this is an answer. Another and a very important function is the increase of power consequent upon the employment of these devices by which di-
59 rection may be given to both boats with the expenditure of a small amount of power applied to the steering wheel in both cases.

JAMES M. BLANCHARD.

Stipulation of Counsel.

Complainant's counsel notifies counsel for the defendant that he here closes his testimony-in-chief, reserving, however, the right (which is conceded by counsel for defendant) of calling one or two additional witnesses to prove that the model Exhibit J, J, J, No. 10, is a true representation of the coupled boats introduced by the defendant on the Pennsylvania canal, and counsel for complainant agrees to take said additional testimony-in-chief in Philadelphia, when the defendant may take testimony in its behalf in said city.

60 JOHN MCCREARY *vs.* THE PENNSYLVANIA CANAL COMPANY. } No. 66. U. S. C. C., E. D. of Penna., Oct. Sess., 1873.

Depositions of Witnesses.

Taken before Samuel Bell, United States commissioner, on behalf of the complainant in the above cause, at room No. 12, Pennsylvania Railroad building, southeast corner of Fourth street and Willing's alley, in the city of Philadelphia, State of Pennsylvania, at 11 o'clock a. m. the 31st day of March, A. D. 1876, in accordance with the stipulation filed in the above cause.

First Meeting.

MARCH 31, 1876.

Present: J. J. Coombs, Esq., representing the complainant, and A. B. Shearer, Esq., on behalf of the respondent.

JOSEPH CAMPBELL, being duly affirmed according to law, deposes and says:

1 Q. State your name, age, residence, and occupation.

A. Joseph Campbell; age, forty-two; occupation, machinist; I reside at Middletown, Dauphin county, Pennsylvania.

2 Q. Please look at two sheets of drawings, marked X and X′, and state who made the drawings, and what they represent.

A. They were made by P. Messiner, and they represent the machinery—the steering machinery—used in the boats of the Pennsylvania Canal Company.

3 Q. State whether you are well acquainted with coupled boats used by the Pennsylvania Canal Company on the Pennsylvania canal, and what opportunities you have had of examining them.

61 A. I have been on them at various times and find this to be a correct drawing of them.

4 Q. Please refer to the different parts of the machinery shown on this drawing and state what they are.

A. "*a*" is the chain for steering the boats; "*b*" is the screw for working the chains; "*c*" is the wheels for working the screw; "A" represents a gum spring and claw-hooks, to which the steering chain is attached; "*d*" is a chain, holding the boats to a centre. They also have a gum spring and claw-hooks, marked "*b*."

5 Q. Referring to sheet X′, please state what figures 1, 2, 3, and 4 represent.

A. Fig. 1 represents a detailed view of the claw-hook, where chains attach to; figure — is a plain view and figure 2 is a side view of the same; figures 3 and 4 are detached views of centre-coupling chain attachment, marked "*b*," on sheet X′.

6 Q. How many boats have you seen belonging to the Pennsylvania Canal Company coupled and steered according to the rigging shown in these drawings?

A. I couldn't name the number. I have seen a great many. I was on one last fall at Middletown; on one at Harrisburg the same fall.

I was on two in Middletown Thursday of this week. I have stood on the banks of the canal and seen a great many. I can't tell the exact number.

7 Q. Please examine photograph marked "W" and state what it represents.

A. The photograph is taken from the same boats the drawing is made from—boats No. 135.

8 Q. Do you mean it is taken from the identical boats or boats like them?

A. I mean to say the machinery from which the drawings were made were taken from the same boats.

Cross-examined:

9 Q. You say you are a machinist. What do you work in?

62 A. Steam-engines and machinery in general.

10 Q. Have you a shop of your own or do you work for somebody else?

A. I am one of the firm of Raymond & Campbell.

11 Q. How long have you been in Middletown?

A. Since 1856, in business.

12 Q. Do your firm do any work on the canal or on canal-boats?

A. We do.

13 Q. Specify the kind of work.

A. We have some work for the Pennsylvania Canal Company outside of their iron-work—ordinary repairs for boats when away from Harrisburg. We have made a number of steering machinery for E. & J. McCreary for canal-boats.

14 Q. How long have you done this kind of work for McCreary?

A. It has been a long time. We made the first experimental machinery for McCreary. It must have been in 1860 that we made some coupling machinery. Every year since 1860 we made some coupling machinery for E. & J. McCreary; from that year up to the present time we have been making. I made one set of steering machinery to go to Baltimore last summer. We are now just completing machinery on a canal-boat called "A. J. Whitney"—propelling machinery.

15 Q. Haven't you or your firm done pretty much all of McCreary's work since 1860?

A. In machinery I might say we have, but not iron-work; they make their own iron-work.

16 Q. When did you see these three boats that you have specified—one at Middletown, one at Harrisburg, and one last Wednesday?

A. It might have been in November, say November. In Harrisburg, say last December.

17 Q. Have you seen either of those boats since you last

63 mentioned, and, if you have, which of them, and when, and where?

A. There is two pair of them laying in Middletown. I was on both of them yesterday, 30th day of March.

18 Q. Were these the same boats you saw last December, November, or last Wednesday?

A. They were the same boats I saw in Middletown; they are tied up there.

19 Q. You say you were on one in Middletown and one in Harrisburg, and you have now spoken of two pair in Middletown.

A. I say that there are two pair in Middletown that I saw yesterday; the same boats that I saw there in the fall.

20 Q. Did you put the steering rig on any of these boats that you have mentioned?

A. No, sir; they are Pennsylvania Canal Company boats, and they make their own steering machinery.

21 Q. How do you know they are Pennsylvania Canal Company's boats?

A. They are marked Pennsylvania Canal Company boats No. 135; that is all I know; their boats are all marked "Pennsylvania Canal Company," all that I ever see.

22 Q. Give the number of every boat that you can recall, belonging to this company, with this rig on it.

A. That is asking too much. I can't name any at all. I could not have named the number of the "135" boat if I had not seen it on the photograph.

23 Q. Now, can you testify positively that the company's boat No. 135, which that photograph seems to represent, is one of the boats you saw on yesterday?

A. Yes, sir.

24 Q. You remember the number?

A. I do.

25 Q. How do you know that this boat is the property of the defendant corporation, the Pennsylvania Canal Company?

A. By its having the name "Pennsylvania Canal Company."

64 26 Q. Is that all you know about the ownership of any of the boats to which you have referred?

A. No; having been on Blankenhorn's boats and he being an employee of the company.

27 Q. How do you know he was?

A. He informed me so.

28 Q. Then, you haven't any knowledge about the matter?

A. I have.

29 Q. Let us have your knowledge.

A. I only know Blankenhorn is running "the Pennsylvania Canal Company's boats," and by general conversation——

30 Q. Do you know that Blankenhorn is an employee of the Pennsylvania Canal Company?

A. He was for a number of years, but of late years he is running the boats—that is, two pair of these boats—and he's got some arrangement with the company; I forget what you call it; running the boats on commission I suppose you'd call it.

31 Q. Don't you know that there are a great many boats on this canal that, although they are marked "Pennsylvania Canal Company," they do not belong to the company?

A. I don't, sir. I don't think there is any.

32 Q. Don't you know that a great many of these boats marked "Pennsylvania Canal Company" are run by parties not employees of that company?

A. I do not.

33 Q. Who run this boat, No. 135, last, that you know of?

A. I can't tell.

34 Q. When you were on this boat yesterday did you compare the drawings X and X′ with the steering rig?

A. I did.

35 Q. It is exactly right, is it?

A. It is.

36 Q. Do you see no difference between Exhibit X and the photograph, as far as you can compare them?

65 A. They are both the same.

37 Q. And all the company's boats you have referred to had the same rig?

A. Yes, sir.

38 Q. Please point out the claw-hook in these rigs.

A. Witness points out figures 3 and 4 of X′.

39 Q. When did you first see a boat rigged this way, and where, and who did it belong to?

A. I have seen that steering machinery for several years. I saw it on the Pennsylvania canal; never had my attention called to it until within a year.

40 Q. Was it on one of the boats marked Pennsylvania Canal Company?

A. It was.

41 Q. When was your attention called to the machinery on the boat marked Pennsylvania Canal Company?

A. Within a year, passing Middletown.

42 Q. Who called your attention to this boat at that time?

A. On one occasion Mr. McCreary called my attention to it—Jno. McCreary.

43 Q. I mean the first occasion we have been talking about. Who first called your attention to it?

A. I think myself called my attention, being different from the others.

44 Q. Did you call Mr. Creary's attention to it afterwards?

A. I did not.

45 Q. Did he call yours to it afterwards in connection with the differences you noted in it?

A. Yes.

46 Q. Have you or your firm any business connection with Jno. McCreary other than as employers and employee?

A. None at all.

47 Q. Have you any interest in Jno. McCreary's patent, reissue No. 5630, or in the steering rig?

A. None at all.

66 48 Q. Do you know how long these boats had been running with this rig before the difference attracted your attention?

A. I do not.

49 Q. What were these differences, and what were they different from?

A. The difference that I noted was the differnce in the machinery on top, having a screw to work the machine instead of cog gearing and drum. The boats of the Pennsylvania Canal Company were different from McCreary patented machinery, different in that particular.

50 Q. Is that the only particulars of difference between those two systems of steering apparatus?

A. Witness says, if I am going to answer that I want to see McCreary's patent.

51 Q. Defendant's counsel requests the witness to state what patent he wants to see.

(Complainant's counsel hands to the witness J. McCreary's reissued patent No. 5630, of October 28, 1873.)

(Defendant's counsel demurs to the witness being prompted or his answer dictated in this manner.)

(Complainant's counsel states that the witness having been asked to point out other differences in the rig between the Pennsylvania Canal Company boats and McCreary's patented machinery, and the witness having stated that he would like to see McCreary's patent before answering the question, complainant's counsel have the right to hand to the witness a copy of McCreary patent, on which the suit is brought, and that he has in no other way prompted the witness or dictated his answer.)

A. That is the only difference that I noticed.

53 Q. Is this reissue 5630 the McCreary patent you refer to in your previous answer?

A. No, sir; I don't know anything about the patent.

67 54 Q. You have said that you have been on the company's boats various times, and that Exhibit- X and X′ are correct drawings of the coupled boats used by this company, and you have explained the different parts represented in those drawings. You have also mentioned "McCreary's patented machinery." My question now is, What patent did you refer to, and which McCreary did you mean in that reference?

A. In that reference I was answering your question, what difference I noticed between the Pennsylvania Company machinery and McCreary's machinery. I answer, I notice the Pennsylvania Company steer with a screw, while the McCreary machinery is steered with a wheel and cog gear and drum. I am not referring to any patent; I am referring to Jno. McCreary's steering machinery.

55 Q. Then, by the McCreary patented machinery you mean Jno. McCreary's machinery, without reference to his patent 5630?

A. Yes, sir.

56 Q. Now please designate, with the knowledge you have said you possess in this behalf, what you mean by McCreary's patented machinery.

A. I mean McCreary's patented boat-steering machinery.

57 Q. What constitutes this steering machinery, as you understand it?

(Objected to on the ground that the witness is not shown to be an expert, and is not offered as such.)

(The defendant's counsel explains to the witness that the question simply calls for a statement of the meaning of his own words, not for any opinion about it, but merely an explanation of what he means by steering machinery referred to.)

A. When I speak of McCreary patent I mean I have read McCreary's claims. I mean by McCreary machinery the system of chains and gearing for steering boats.

68 58 Q. Do you know whether or not there is more than one McCreary patent on this system of machinery?

A. There is but one system, but it has been improved. There is more than one.

59 Q. How many that you know of?

(Objected to as not proper cross-examination, inasmuch as the witness was not asked, on his direct examination, anything about any McCreary patents, or any patents whatever.)

A. Only two, and that only by what I see here.

60 Q. You say you have made some "experimental machinery for McCreary; it might have been in 1860." Was that coupling boats?

A. It was.

61 Q. Do you remember the name of the boat, or how it was designated?

A. I don't know; I couldn't identify it.

62 Q. When did Jno. McCreary call your attention to the defendant's boat?

A. Within a year.

Redirect:

(Complainant's counsel offers in evidence drawings X and X′ and photograph W, marked respectively Exhibits X, X′, and W.)

63 Q. Have you seen coupled boats that were known as McCreary's patented boats?

A. I have.

64 Q. Then, when you referred to McCreary's patented machinery you had reference to machinery you had seen on such boats, without reference to his patent or patents?

A. Yes, sir.

JOSEPH CAMPBELL.

Affirmed and subscribed to before me this 31st day of March, A. D. 1876.

SAMUEL BELL,
U. S. Commissioner.

69 JOHN MCCREARY, being duly sworn to tell the truth, the whole truth, and nothing but the truth, deposes and says:

65 Q. Are you complainant in this case?

A. I am.

66 Q. Look at the drawings marked Exhibit X and Exhibit X′ and state what they represent and what you know about them.

A. These drawings represent precisely what the Pennsylvania Canal Company are coupling and steering their canal-boats with. I employed an artist, and he and I got aboard one of those pair of boats at Middletown, and he sketched them—the top view—while we were on the boats, and the side view was taken from the bank of canal in my presence.

67 Q. Look at photograph marked Exhibit W and state what that is and what you know about it.

A. I employed a photographer, and he took a view of these Pennsylvania canal-boats from the tow-path of the canal at Middletown, where the boats were lying, in my presence. The Exhibit W is the photograph taken.

68 Q. Did he take the photograph from the same pair of boats that he took the drawings from?

A. That I can't say. We took this sketch last fall and the photograph some ten days since. I believe them to be different boats. The Pennsylvania Canal Company boats all represent each other in steering mechanism and construction of boats. Without the numbers, I would not be able to tell them apart as a boat-builder.

Cross-examined:

69 Q. Then what the photograph, Exhibit W, don't show we may take from Exhibit X?

A. The drawing is a correct one. If there is any part on the drawing that ain't shown on the photograph the instrument couldn't show it.

70 Q. Why did your artist in making Exhibit X leave the rudder blade off the stern post?

70 A. The drawing, Exhibit X, shows it.

71 Q. What time last fall did you have this sketch, Exhibit X, taken?

A. It was late in October or early in November.

72 Q. Was that the first time you noticed that rig on the company boat?

A. No, sir.

73 Q. When did you, first?

A. I think I saw the first pair of the Pennsylvania Canal Company's boats that passed Middletown having steering mechanism on as shown in Exhibit X, which is two years or more ago; I can't say positively.

74 Q. Were those the first coupled boats that the company used, as far as you know?

A. The Pennsylvania boats that passed Middletown were the first I saw coupled by them.

75 Q. Were those the first coupled boats you saw on this canal—on the Pennsylvania canal?

A. No, sir.

76 Q. When were the first?

A. The first coupled boats that I ever saw was in 1860, built by my brother and me.

77 Q. Were they run on this canal?

A. They were boated on the Wisconisco canal, Pennsylvania canal, Susquehanna and Tide-Water canal, and Chesapeake and Delaware canal.

78 Q. How many of them were there?

A. One pair—two boats.

79 Q. How long were they run of these canals or any part of them?

A. For two full boating seasons.

80 Q. What seasons were they?

A. It commenced in the boating season, August, 1830, and continued to August, 1862.

81 Q. Who run these boats during those two seasons?

A. John Emerick and Jacob Albright.

71 82 Q. Are they alive now?

A. Jacob Albright is dead.

83 Q. Did you employ them? What arrangement were they run under, or did they hire the boats from you?

A. My brother and I sold them a half interest on conditions if they would work and operate as double boats they were to pay us a named price; the reason of that was if the boats could be steered and navigated as double boats the chief engineer of the Pennsylvania Canal Company, Thos. J. Wireman, gave us an abatement of half tolls. Thos. J. Wireman accepted the boats and they bought one-half interest; shortly afterwards we sold them the entire boats.

84 Q. When was this sale,?

A. Shortly after the boats were accepted; they were accepted on their trial trip.

85 Q. How were these boats coupled?

A. They were coupled as shown in Exhibit J, J, J, No. 5, in my former deposition in this case.

86 Q. Between 1860 and 1872, were there any other coupled boats run on this line of canals?

A. There was.

87 Q. Who, besides your brother and yourself, had any coupled boats running within this time?

A. Some time in 1869 or 1870 William Frick had coupled boats which were altered.

JOHN McCREARY.

Sworn and subscribed before me this 31st day March, A. D. 1876.

SAMUEL BELL,
U. S. Commissioner.

At 3 o'clock p. m. a recess for one hour and a half was taken, to meet at the office of Theodore Cuyler, Esq., No. 704 Walnut street, city of Philadelphia, at 4½ o'clock p. m.

72 FRIDAY, *March* 31*st*, 1876—4½ o'clock p. m.
704 Walnut street.

By agreement of counsel the taking of depositions on behalf of defendant is postponed until Tuesday, April 4th, 1876, at 11 o'clock a. m., at the office, room 12 Pennsylvania railroad building, Fourth street and Willing's alley, Philadelphia, Pennsylvania.

JOHN MCCREARY *vs.* THE PENNSYLVANIA CANAL COMPANY. } No. 66. U. S. C. C., E. D. of Penna. October, 1873.

Testimony of witnesses produced, sworn, and examined on behalf of the complainants in above cause, before Samuel Bell, Esq., U. S. commissioner, special examiner, on the 16, 17, and 18 day of May, A. D. 1876, at the office of Henry Baldwin, Jr., Esq., in the city of Philadelphia, Pennsylvania.

TUESDAY, *May* 16, 1875.

Complainant's Testimony in Rebuttal.

Present: J. J. Coombs, Esq., representing the complainant, and Henry Baldwin, Jr., Esq., and A. B. Shearer, Esq., on behalf of the defendants.

JOHN VAN HYNING, a witness on behalf of the complainant, being duly sworn, deposes and says:

1 Q. What is your name, age, residence, and occupation?

A. John Van Hyning; I am 43 years of age; I live in York county, Pennsylvania, and am at present farming; have been boating.

2 Q. What experience have you had in running canal-boats?

A. Over twenty-five years on the Genesee canal, in New York State; the Erie canal, in New York State; the Susquehanna and Tide-Water, and the Pennsylvania canal, and the Wisconisco canal.

73 3 Q. Have you ever seen a pair of canal-boats that were steered one from the other and coupled together by a chain like that marked "D" in the reissue patent No. 5630, issued to John McCreary, and dated October 28th, 1873?

A. Yes, sir; I have. I saw it on the Pennsylvania canal last Thursday.

4 Q. State how that chain was attached to the forward boat.

A. It had a turn on the bow stem of the hinder boat, fastened with a bolt. They were crossed in front of the stem and fastened to the front boat by a claw-hook at each end of the chain.

5 Q. Were there any springs in connection with those claw-hooks to allow them to give when a strain was put upon them?

A. There was not; they were bolted right down to the deck; they were bolted to a plank for that purpose; plank and claw-hooks were bolted right straight to the deck or overhang.

6 Q. Please look at model marked J. J. J. No. 16 and state how

far the coupling of these boats that you have just spoken of corresponds with or differs from the coupling shown in said model.

A. The centre coupling corresponds with the model.

7 Q. How does the steering mechanism in the boats you have referred — correspond to the steering mechanism shown in model J. J. J. No. 16?

A. It corresponds with it, except that the steering wheel is different; it is steered with a chain and cog-wheel.

8 Q. Who owns the pair of boats that you have spoken of?

A. Robert C. Hall, I am informed, of Baltimore. They formerly belonged to Hall Brothers & Co.

9 Q. Do you know whether this was one of the pairs of boats that Elijah and John McCreary built for the Hall Brothers in spring of 1871?

74 A. I do.

10 Q. Were you familiar with those boats built by E. and J. McCreary for the Hall Brothers, and did you ever run any of them?

A. I am familiar with them, and I superintended the running of them for 2 years—1871 and 1872.

11 Q. What alteration had been made in this pair of Hall boats that you saw last Thursday?

A. There was a plank bolted over the notch and the chains put on instead, for the purpose of coupling and steering them.

12 Q. Did you run on this pair of boats after they were altered as you have mentioned; and, if so, how did they operate?

A. I did run on them, and they operated well. They run nearly 15 miles from railroad bridge below Coxtown to railroad bridge above Middletown.

13 Q. In that trip did you pass any locks or curves in the canal?

A. We passed the weigh lock at Harrisburg and lock at Harrisburg and lock 2 miles below Harrisburg. There is a very short curve in the coming out of the weigh lock at Harrisburg into the lock at Harrisburg; I believe as short a curve as is on the line.

14 Q. Did the coupling chain break any time on this trip?

A. It did not.

15 Q. In your opinion would springs connected with the chain hooks similar to those shown in large model marked Defendant's Exhibit No. 19 be at all necessary on the boats coupled like those that you saw last Thursday? And give your reason for your opinion.

A. There would not be any use to have springs, as there is no very heavy strain on that coupling, as the couplings is only necessary to keep the boats centered.

75 16 Q. Have you measured the springs on any of the Pennsylvania Canal Company boats connected with the claw-hooks to which the coupling chain is attached; and, if so, what was this measurement?

A. I have measured some of them. I measured boats No. 74 and No. 75; the gum was ten (10) inches in length; and boats No. 156 and No. 157; the gum was 10 inches in length; and boats No. 152

and 153; the gum was 10 inches in length; and boats 140 and 141; the gum was 10 inches in length; and boats No. 40 and 43; gum was 10 inches in length; boats 104 and 105; the gum was 10 inches in length; and the boats 176 and 177; gum was six (6) inches in length; and boats 122 and 123; gum was 10 inches in length.

(Answer objected to so far as it assumes or purports to state that the boats mentioned by the witness belong to The Pennsylvania Canal Company, this defendant.)

17 Q. How do you know these boats belonged to the Pennsylvania Canal Company, or what reason have you to think they did?

(Objected to, this witness not having stated that the boats did belong to the company.)

A. Because the Pennsylvania Canal Company's name and number was on them.

18 Q. Did you measure the bumper on the rear ends of the forward boats? And, if so, state how wide the extreme square ends of them were.

A. I did measure them. They measured from ten (10) to eighteen (18) inches, 10 inches being the shortest and 18 inches the longest square bumper that I measured. There was two boats that had oval bumbers.

76 19 Q. Did you ever run a pair of boats built by Wm. Friek and rigged according to his patent of September 29th, 1868, now shown you, Defendant's Exhibit No. 29?

A. I have. The name of the boat was "Tide-Water." I run it over five years.

20 Q. Did you own that boat or any interest in it?

A. I owned it.

21 Q. Did you have that boat altered at any time; and, if so, how altered, and who altered it?

A. I had it altered by John and Elijah McCreary, with their patent rigging for steering. I took off Friek's coupling bar, and it was rigged as the model No. 16, with the exceptions of the coupling chains. I used a notch instead.

22 Q. What did you do to the concave end of the forward boat?

A. I had it cut off and made it convex.

23 Q. What were your reasons for having those alterations made?

A. It did not work well on account of swells from a lock. The corners of the concave of the forward boat would catch on the overhang of the hind boat—that is, the convex of the hind boat. The effect would be to tear the irons loose, and wood-work also. The corners of the concave would catch on the lock gates while locking through single locks. It was a great trouble.

24 Q. How about the coupling bar? Did you have any difficulty with that; if so, what?

A. I did; it broke three times with me.

25 Q. Can you give about the weight of that coupling bar and the standards through which it passed?

A. I never weighed it. I believe it would weigh from twelve to fifteen hundred.

26 Q. Do you know the cost of that coupling bar and standards?

A. I do not.

27 Q. Please to state whether, after you got the boats altered
77 by the McCrearys, they operated better or worse than they did before.

A. They operated a great deal better. I considered it a great improvement in steering boats.

28 Q. Please state what was the effect on the Friek boats before they were altered on passing their centres in turning a curve.

A. In passing their centres the bow of the hind boat would get so far out of line of the front boat that it was a hard matter to straighten them up, often taking a second man at the wheel.

29 Q. If you happened to meet another boat on a curve what was the effect of their getting so much out of line?

A. The only trouble I found was the stern of the hind boat crowding the meeting boat on the tow-path; that was one great trouble we had.

Cross-examined:

30 Q. When did you first see, and where, a pair of coupled canal-boats?

A. The "Experiment" was the first I ever saw, about the year 1861 or 1862, on the Tider-Water canal—McCreary's boat, called the "Experiment."

31 Q. How was the "Experiment" coupled when you saw it?

A. By ropes or chains attached to the front boat, running through sheaves on the bow of the hind boat and then to a windlass.

32 Q. Do you recollect which were used when you saw it—ropes or chains?

A. I do not recollect.

33 Q. How many ropes or chains were there?

A. As far as I can mind, there was one.

78 34 Q. How close together did that one keep the stem of the rear boat and the stern of the fore boat?

A. It kept them close together.

35 Q. In contact?

A. In contact.

36 Q. Was the stern of the front boat notched?

A. It was not.

37 Q. Was there any overhang or guard or bumper at the stern of that front boat?

A. There was not.

38 Q. Was the stern of that boat square across; and, if not, how shaped?

A. It was not square across; it was in this shape:

a is the forward boat and *b* is the after boat. The stern of *a* had a stern post with a semicircular grove in it from top to bottom.

39 Q. Did the rope or chain on these boats hold them in contact at all times, whether loaded or light?

A. I don't mind of any other coupling.

40 Q. Question repeated.

A. It did.

41 Q. Then the stem of the rear boat and the stern of the front boat, thus coupled by a rope or chain, formed a sort of universal joint, did it?

A. I don't understand the word "universal."

42 Q. In these boats, thus coupled, in how many ways could one or the other of them turn?

A. Two ways—either to the right or left.

43 Q. The windlass was on which boat—front or rear?

A. The rear boat.

79 44 Q. When the steering rope or chain was tightened up on one side was it also tightened up on the other side, or was it slack on one side and taut on the other?

(Question objected to and all other testimony by the witness on the subject of the "Experiment" as not being cross-examination of any testimony given by the witness on his direct examination; and I shall claim the right to cross-examine the witness in reference to all his testimony as to said boat.)

A. It was tight on both sides.

45 Q. Was there no connection between the two boats except the steering rope or chain and their point of contact?

A. Not that I mind of.

46 Q. How were the ends of that rope or chain secured, and at what point—on which boat?

A. They were fastened by a link and pin down through the link. They were fastened on the hind part of the front boat and then run through a sheive on the front part of the hind boat and then to the capstan or windlass.

47 Q. How many sheives did that rope or chain run through?

A. One sheive on each side; two each boat; four in all.

48 Q. Was this pin a straight pin or bolt?

A. It was a straight pin. We had to pull the pin to release the end of the chain.

49 Q. What was the next coupled boat that you saw, and when and where?

A. The next coupled boat that I saw was the "Tide-Water," at Wrightsville, York county, Pennsylvania, either in 1866 or 1867. It was in 1867. It was Frick's patent.

50 Q. What was the next one?

A. The Sixteenth Amendment—McCreary's boat—at Middletown, in 1868 or 1869.

80 51 Q. The next one?

A. The "Etter, Seiple, and Carmony"—Frick's patent. It was about 1868.

52 Q. The next one?

A. The Wm. P. Jenks—Frick's patent.

53 Q. The next one?

A. The four section boats built by McCreary's for Hall Brothers & Co. in the spring 1870.

54 Q. Up to this time, 1870, did you run any of these coupled boats you have mentioned?

A. I did.

55 Q. Which of them?

A. The "Tide-Water." I run the "Tide-Water" nearly three (3) seasons and superintended the running Hall Brothers' four (4) boats and the "Tide-Water" two seasons.

56 Q. Since then what coupled boats have you run or superintended?

A. None since I sold the "Tide-Water" on the 13th September, 1873.

57 Q. When and where did you first see a pair of canal-boats that were steered one from the other and coupled together by a chain, like that marked "D" in the reissue No. 5630?

A. I don't understand the chain marked "D," or at least I want to know what chain is marked "D" in the patent.

58 Q. Look at the patent and see.

A. It was in 1872 or 1873, on the Pennsylvania canal.

59 Q. Whose boat was it?

A. The Pennsylvania Canal Company's, as far as I know.

60 Q. How far was that chain in that boat in 1872 or 1873 like the chain "D" in this patent No. 5630? State fully what you mean in respect to this resemblance.

A. It was about the same-sized chain and fastened about in the same manner except in using the gum.

61 Q. Explain how you understand the chain "D" in the patent reissue 5630 to be fastened.

81 A. It is a chain with one turn on the stem of the hind boat fastened to the stem of the boat by a bolt crossed in front of the boat and fastened to claw-hooks on the stern of the front boat.

62 Q. Have you read this patent, 5630?

A. I have not.

63 Q. Then when you testified that last Thursday you saw a pair of boats coupled by a chain like that marked "D" in that patent what did you go by?

A. I see the patent now and saw the boats then. I went by the boats. I saw the boats then and I see the patent now.

64 Q. If you had not read the patent how do you find a chain marked "D" to compare with the chain on the boat?

A. I see it on the drawing.

65 Q. Now, please state how this boat you saw on Thursday had the chain "D" fastened.

A. It was fastened the one turn on the stem, a bolt drawn through the chain in the stem, crossed in front of the stem of the hind boat, the ends fastened to claw-hooks on the front boat—the stern of the front boat.

66 Q. In this drawing of the patent No. 5630 do you see any claw-hooks holding the chain "D"?

A. I do not.

67 Q. How near the extreme end of the overhang of the boat are these claw-hooks that hold the chain as you saw on the boat last Thursday?

A. About two (2) feet from the extreme end.

68 Q. Were they on the deck?

A. They were on a plank fixed for that purpose and the plank and claw-hooks bolted solid to the deck.

69 Q. How far apart were the ends of the chain "D" thus secured on the boat?

A. About five (5) feet.

70 Q. How much chain was there extending from one claw-hook, through the stem of the rear boat and to the other claw-hook?

82 A. From twelve (12) to fifteen (15) feet long.

71 Q. How long was the projection of the stem of the rear boat—the cut-water?

A. About eight (8) inches.

72 Q. Was the chain fastened to the stem at the middle of the length of the chain?

A. I never measured it exactly, but I think it is.

73 Q. Then you had on that boat, between the point of attachment and the cut-water and the claw-hook, on each side from six feet to seven and a half feet, about, of chain?

A. Yes; from the fastening on the stem.

74 Q. Now, with a stem having only eight inches projection and the chain six or seven and a half feet long on each side how much slack would there be between those two boats?

(Question objected to, as the question involves a geometrical calculation, and the witness is not, probably, able to answer it. The true question should be, "What was the slack of the chain on these boats?")

A. We had at that day three or four inches slack of the chains, the slack of the chains being regulated by the link that is dropped in the claw-hook.

75 Q. On that pair of boats, then, you did not have the extreme ends of the chain fastened in the claw-hooks?

A. We did not.

76 Q. Did you take up any slack of that chain that day?

A. I did not.

77 Q. About how far from the ends did you have that chain fastened in the claw-hooks?

A. From five (5) to ten (10) inches.

78 Q. Did you let out any slack of that chain that day?

A. I did not.

79 Q. You started, then, with about three (3) or four (4) inches slack and kept it so?

A. Yes, sir.

83 80 Q. What governed the adjustment of the slack at three (3) or four (4) inches in this case? Why was that allowed?

A. The allowance was made to bring the pulling weight on the outside chains—the steering chains.

81 Q. During your observation of this boat on the run you have mentioned was either or both of the boats loaded or were they light?

A. They were both loaded.

82 Q. Did the stem of the rear boat, at any time when you were under way, actually touch the stern or overhang of the forward boat?

A. It did.

83 Q. In that case all the strain was on the steering chain, was it not?

A. It was.

84 Q. And the chain "D" slack?

A. The chain "D" would be slack at all times unless the boats would want to get off the centre. At that time it would tighten one or the other chain.

85 Q. When the chain "D" was slack and the boats in line and the stem and stern actually touching each other what does the chain "D" have to do with the coupling of those boats?

A. It has to keep them on the centre—the rear boat centered with the first boat.

86 Q. How did it do that under the condition stated in the last question?

A. By the ends of the chains being fastened on the claw-hooks of the front boat, opposite to one another.

87 Q. What has the fastening on the claw-hooks to do with it?

A. Helps to hold the boats on the centre.

88 Q. Would it make any difference if, instead of fastening to the claw-hooks, the ends of the chain "D" were fastened to the boat by some other means?

84 A. I don't think it would if the fastenings were strong enough to hold.

89 Q. On the boat last Thursday, was there any yielding or give to the chain "D"?

A. There was not.

90 Q. Who fixed these boats the way you saw them last Thursday?

A. I was informed that Elijah McCreary done it.

91 Q. Who gave you that information?

A. John McCreary and the captain on board of the boat.

92 Q. By John McCreary you mean the complainant now present?

A. Yes, sir.

93 Q. Was John McCreary with you on that run?

A. He was not.

94 Q. Was Elijah McCreary?

A. He was not.

95 Q. Did you make that run in the employ of John McCreary, at his request?

A. I made it at his request.

96 Q. Did he start you off on that run?

A. He was not there.

97 Q. Who made this adjustment of the chain "D," as you have described, so as to allow this three or four inches slack?

A. Captain Dodson.

98 Q. Do you know when this boat was fixed, as you have described?

A. I do not.

99 Q. Was last Thursday the first time you ever saw it with this chain "D" on it?

A. It was.

100 Q. How much had been done to the stern of the forward boat besides filling up the notch and planking down the claw-hooks?

A. Not anything that I can see.

85 101 Q. Please describe the difference, if any, that you observe between the operation of the pair of boats last Thursday and the operation of the same boat- when they had the notch in them, without the chain "D," when you superintended them before.

A. When I superintended the Hall boats, in turning the short curves the cut-water of the hind boat would leave the notch of the front boat, but the chain "D" held them on the centre at all times or round any curve in the canal.

102 Q. Is there slack enough in the steering chain of the Hall boats, as you superintended them, to let the stem leave the notch without pulling the front boat to one side or the other after it?

A. Only when in making short curves. If the boats are straight they cannot get out of the notch.

103 Q. With such an amount of slack as would permit the stem to leave the notch, even in turning a short curve, would you have steering purchase on the chain in the Hall boat?

A. I would.

Q. 104. Was not the steering chain in the Hall boat fastened with claw-hooks?

A. They was.

Q. 105. Did not that enable you to take up the slack so that the stem could not leave the notch in turning a short curve?

A. It might be taken up if you had a man there to do it at all times.

106 Q. Well, if you had a man there to do it, and if he did do it, would not the taking up of that slack prevent the stem from leaving the notch in turning short curves?

A. I can't say, for I never tried it.

107 Q. What is your best judgment about that from running those boats for several years?

A. I believe it would, according to my judgment.

108 Q. How would it get out?

86 A. It would get out by the stem lying crosswise on the notch, and naturally prying itself out.

109 Q. For the stem to get crosswise in the notch, nothing having

given way, must there not be some slack in the steering chain that might be taken up yet?

A. There would be slack in the steering chain that might be taken up.

110 Q. In these boats you saw Thursday, with the claw-hooks two (2) feet from the stern, were the sheaves for the steering chains and the claw-hooks for the ends of the steering chains left just where they were when you used the boat with the notch?

A. They were.

111 Q. Does the drawing of the patent 5630 represent the position of those sheaves and claw-hooks as they are on that boat?

A. They do, with the exception that the boat referred to uses the chain cog wheel for steering instead of the drum, and having a chain cog wheel instead of the two sheaves represented in the drawing near the drum wheel—the sheaves marked "*f f*."

112 Q. Then, in fact, the boats you saw Thursday are not like the drawing of the patent 5630, except as to the coupling chain "D"?

A. It is not.

113 Q. Don't the use of the chain gearing with the steering chain make a difference in the operation of the boat compared with the use of the drum?

A. As far as I can remember, they both answer the same purpose.

114 Q. Do they answer the same purpose in the same way?

A. They answer the same purpose, but they don't work in the same way.

Adjourned until 10 o'clock Wednesday, May 17th, 1876, without concluding the examination of the witness, John Van Hyning.

87 WEDNESDAY, *May* 17, 1876.

Present: Henry Baldwin, Jr., and J. J. Coombs, Esq.

Cross-examination of JOHN VAN HYNING resumed:

115 Q. You say that on the boat you saw last Thursday the "coupling chain had a turn on the bow stem of the hinder boat fastened with a bolt; they were crossed in front of the stem and fastened by a claw-hook at each end of the chain." Do you find any such turn or crossing of the chain in the reissue No. 5630?

A. I do not. In my answer yesterday to cross-question No. 61 I gave the way the chain was on the boats, instead of the way it was shown in the drawing, mistaking the question in that respect.

116 Q. Then the model J, J, J, No. 16, shows the way the boats you refer to are coupled with a chain having a turn and crossed and fastened by the claw-hooks more nearly than the drawing of the patent No. 5630?

A. The only difference is that in the model No. 16 the chain has not got the turn around the stem as in the boats I referred to.

117 Q. Do you know how a pair of boats would operate if they were coupled exactly as shown in the drawing of the patent No. 5630?

A. I believe they would work as well as to have the chain around

the stem. I never operated any coupled that way, and could not say.

118 Q. Would the stem of the rear boat be kept at all times in contact with the stern of the fore boat if they were coupled as shown in the drawing of No. 5630?

A. I believe it would.

119 Q. Then what would be the use or effect of the chain "D"?

A. To keep the boats in contact.

120 Q. If it was so tight as to keep the boats in contact, do you think they would steer right—the chain "D"?

88 A. I do.

121 Q. If you had a little slack in the chain "D," would it keep the boats in contact?

A. It would.

122 Q. How much slack could the chain "D" have and yet hold the boats in contact?

A. One or two inches.

123 Q. If the chain "D" holds the boats in contact, why do you say there wouldn't be any very heavy strain on that coupling and therefore springs would be of no use?

A. All the pressure of pulling is on the steering chains, and the chain "D" holds the boats in contact when properly coupled together.

124 Q. Well, don't any strain come on the chain "D" at any time?

A. It does in holding the boats in contact.

125 Q. But you don't call that a heavy strain?

A. I do not.

126 Q. Isn't that strain on the chain "D" heavier when the boats are at an angle than when the boats are in line with each other?

A. It is.

127 Q. Isn't it desirable in such cases to have a little give to the chain "D" so as to relieve the strain somewhat?

A. It is not.

128 Q. Isn't it desirable to have a spring that will take up the slack when a strain which compressed the spring is removed?

(Question objected to on the ground that the question amounts to this: Is it not desirable to have a spring when you do have a spring to take up the slack?)

A. If you have a spring to get slack it is necessary for the spring to take up the slack, but the spring is not necessary on McCreary's patent, model No. 16.

89 129 Q. What takes up the slack of the chain "D" in model No. 16?

A. By straightening up the boats to bring them in a straight line with each other.

130 Q. When the boats in Exhibit No. 16 are not in line isn't one side of the chain "D" tant and the other slack always?

A. It is not.

131 Q. Then suppose instead of the chain "D" you had a forked

rod fastened by the middle to the stern of the rear boat and by the ends to the stern of the fore boat, by pivots, allowing the boats to turn, would that operate substantially the same as the chain when it had no slack on either side?

A. I never steered a boat with a forked rod; therefore I cannot say.

132 Q. Did you ever steer a boat that had springs with which the ends of the chain "D" were connected?

A. I did not.

133 Q. How, then, can you judge any better about the operation of the springs than you can about the operation of the forked rod?

A. I have only said that the springs were not necessary on the McCreary boat No. 16.

134 Q. You have given a test of boats of which you have measured the springs. Do you know that any of those boats actually belonged to the Pennsylvania Canal Company?

A. No more than I saw their name on them.

135 Q. On these boats how far were the points at which the ends of the coupling chain were attached to the forward boat from the extreme end of the overhang?

A. About two feet.

136 Q. What is the use, if any, of the turn given to the chain "D" around the stem of the rear boat, and what good does the crossing of the chain do?

A. By crossing the chain it holds the boats more direct on the centre.

90 137 Q. Does that help to keep the boat more constantly in contact?

A. I believe it does.

138 Q. Do you know what the purpose or use of these gum springs is on the boats on which you measured the springs?

A. I have been told that they were used to ease up the strain on the chains by the captains on the boats; otherwise I don't understand this gum or rigging, as I have never boated on their boats nor had a chance to steer them.

139 Q. You have given the measurements of certain springs on these boats. Now please explain whether you have given the measurement only of the coupling-chain springs or of the steering-chain springs as well as the coupling-chain springs?

A. Coupling-chain springs only.

140 Q. Did you measure any of the steering-chain springs on any of those boats?

A. I did.

141 Q. How long did you find them to be?

A. Boat- 174 and 175, 10½ inches; boat- 156 and 157, 12 inches; boat- 152 and 153, 12 inches; boat- 140 and 141, 10 and three-eights inches; boat- 40 and 43, 10 and one-half inches; boat- 104 and 105, 12 inches; boat- 176 and 177, 12 inches; boat- 122 and 123, 12 inches.

142 Q. Is that the length of the entire spring or only the gum in the spring?

A. It is the length of the gum in the spring.

143 Q. Then you found on these boats from 16 to 22 inches of gum on each side of the forward boat?

A. I did.

144 Q. Do you know how much that gum is compressed in the operation of those boats in easing up the strain at any time?

A. I do not.

145 Q. When you had the "Tide-Water" altered how long
91 had you run it on Frick's plan?

A. About two seasons.

146 Q. When you run that boat, after you substituted McCreary's notch for Frick's coupling bar, did you use any coupling chains or connect the boats by any means except the steering chains?

A. I did not.

147 Q. When you saw the "Jenks" with "Frick's coupling" where was she?

A. At the coal chutes at Columbia.

148 Q. When you saw, in 1872 or 1873, on the Pennsylvania canal, the boats with coupling chains did those boats have a steering chain like the model, Exhibit No. 16?

A. It did not?

149 Q. Can you fix the time when you saw those boats first? Give it as nearly as you can.

A. I can't come nearer than before mentioned.

150 Q. From that time until last Thursday did you ever see a pair of boats coupled with a steering chain and a coupling chain like those in this model No. 16?

A. I did not.

151 Q. Have you, up to this time, ever seen a pair of boats coupled with a coupling chain and a steering chain like those in the model, Exhibit 16, and with a horizontal windlass like that model?

A. I have not.

152 Q. Have you, up to this time, ever seen a pair of boats coupled with a steering chain passing around six sheives or pulleys, as in this model No. 16?

A. I have. The "Tide-Water" had a steering chain, six pulleys, and a horizontal steering wheel, the same as model No. 16.

153 Q. This was Frick's patent of 1866 or 1867, as already mentioned by you?

A. It wasn't so in 1866 or 1867. It was in 1870, after Mc-
92 Creary & Brother changed the rigging and put a notch on for steering purpose.

154 Q. What time in 1870 was this?

A. I can't mind the date.

155 Q. Are you positive that it was in 1870?

A. I am not. I think it was in 1871, because it was after the Hall boats were made.

Redirect examination:

156 Q. In the Hall boats as altered, which you saw last Thursday, was the bolt that passed through the coupling chain in front of the stem of the rear boat, as shown in model No. 16?

A. It was not in front; it was in the back part of the stem.

157 Q. The chain was bolted at its centre by a bolt passing through a link, was it not?

A. It was.

158 Q. Does it make any difference in the operation of that coupling chain whether it is crossed in front of the stem post so long as it is bolted at the centre? Would not the operation be the same if it was bolted in the rear of the stem post and passed to the rear of the forward boat without crossing in front of the stem post?

(Objected to as leading and argumentative and as asking an opinion which the witness has not been shown competent to answer, either from practical knowledge or as an expert, and, further, because the witness has already stated the reason for crossing the chain.)

(Counsel for complainant replies that a large portion of the questions put to this witness in cross-examination called for opinions of the witness on matters which an expert only would be competent to give opinions upon, and if the witness has not shown himself to be qualified as an expert the complainant's counsel will move to exclude all the expert testimony given on cross-examination.)

93 A. My opinion is that it would.

159 Q. Would it make any difference in the operation of the coupling chain "D" whether it was used in connection with such a chain wheel to operate the steering chain as was used in the Hall boats or in connection with a horizontal drum, as shown in model No. 16?

A. It would make no difference.

160 Q. You were asked on cross-examination whether you saw on the drawing of McCreary's reissue, No. 5630, any claw-hooks to which the coupling and steering chains were attached and answered that you did not. Please look at figure 2 on the drawing of reissue No. 5630 and state what it is.

A. Figure 2 represents a claw-hook.

161 Q. In the patent it states that the improvements consist: "Second. In attaching the ends of the coupling and steering chains to the boats by means of claw-hooks, so as to render the chains easily adjustable, as hereinafter shown and described;" and in another paragraph it is stated that "D" is a chain the ends of which are attached to the rear overhanging guard "H" of the forward boat at points *h h* and the central part of which is linked to the stern or to a central point on the bow of the rear boat." With this knowledge of the language of the specification would you have any doubt that figure 2 on the drawing represents one of the claw-hooks to which the chains are attached?

(Objected to, first, as new matter, the witness not having been referred to the specifications of the patent either in his direct or cross-examination; second, as incompetent, and, third, as leading.)

A. It represents a claw-hook that holds the boats together with a chain.

162 Q. When did you first hear John McCreary describe the

coupling chain "D" as a suitable means for coupling boats together?

94 (Objected to as new matter.)

A. In the spring he built the Hall boats.

163 Q. Do you know how many boats were ever built in Pennsylvania according to the Frick patent?

A. Three pair are all I know of.

164 Q. What are their names?

A. "Tide-Water," "Etter, Siple, and Carmony," and "Wm. P. Jenks."

165 Q. Do you know of any other of these boats being altered by McCreary the same as the "Tide-Water" was?

A. I do; the Etter, Siple, and Carmony.

166 Q. Do you know what became of the Wm. P. Jenks?

A. I do not.

167 Q. Did she disappear from the Pennsylvania canals; and, if so, at what time?

A. She disappeared in 1872 or 1873; I can't mind which. I know nothing about her since.

Recross-examined, reserving the objections taken:

168 Q. When you saw the Pennsylvania Canal Company's boats, in 1872 or 1873, with a coupling chain and a steering chain were not both of these chains secured by claw-hooks?

A. They was.

169 Q. Those claw-hooks were substantially like Fig. 2 of the patent 5630?

A. They were. They had a forked end, in which the end of the chain was secured.

170 Q. Up to that time you had not seen any coupling chain secured in any way on any of McCreary's boats, had you, in addition to the steering chain?

A. I had not.

JOHN VAN HYNING.

Sworn and subscribed before me this 17th day of May, A. D. 1876.

SAMUEL BELL,
Special Examiner.

95 JAMES A. DODSON, a witness on behalf of the complainants, being duly sworn, deposes and says:

1 Q. What is your name, age, residence, and occupation?

A. James A. Dodson; I am 30 years of age; I reside in York county, Pennsylvania; I am a boatman by occupation.

2 Q. Have you been running a pair of the Hall boats on the Pennsylvania canals; and, if so, how long?

A. I have been running since spring—nearly two months—and have boated on them for nearly two years.

3 Q. Have those boats been altered in any way lately; and, if so, what alterations have been made?

A. They have been altered about two weeks ago. A coupling and centering chain has been put on in place of the notch in the overhang. There was a block put on over the notch.

4 Q. Are these the same boats that John Van Hyning run on last Thursday from the R. R. bridge below Coxstown to the railroad bridge above Middletown?

A. They are.

5 Q. How do they work since this alteration was made?

A. Very well.

6 Q. Do you find any difficulty in the working of the boats in respect to their breaking the chain or in respect to assuming any angle with reference to each other, either vertical or lateral?

A. I do not.

6½ Q. Look at model marked J, J, J, No. 16, and state how the coupling chain on these boats that you run corresponds with or differs from the coupling chain shown in said model.

A. The coupling chain on the boats I run has one turn around the stem of the hind boat; crosses in front of the stem; hooks on the claw hooks of the forward boat.

7 Q. Is that fact of its passing around the stem of the rear
96 boat the only difference between the chain as used on your boats and the chain shown in this model?

A. It is.

8 Q. How much slack have you given the coupling chain on your boats?

A. From two to three inches.

9 Q. Have you ever used it with less slack than that; and, if so, how tight have you drawn it, and what was the effect?

A. I have used it as tight as I could hook it; it worked very well.

10 Q. When the coupling chain was drawn as tight as you could hook it, did it then make a universal joint between them so that the boats could assume any desired angle in respect to each other, either vertically or laterally, and allow one boat to incline to the right and the other to the left?

A. It did.

11 Q. Did the coupling chain ever break when it was hooked up in that way?

A. It did not.

12 Q. How many trips have you made in those boats since the alteration, and from what point to what point?

A. I have made one trip from Middletown to Havre de Grace, back to Middletown, and down to Peach Bottom.

13 Q. On that part of the canal how is it in respect to curves and locks as compared with other parts of that canal and the Tide-Water and Susquehanna and Wisconisco canal?

A. Well, I went over all those canals mentioned; on the Pennsylvania as far as Clark's Ferry. We have as short curves on that line of the canal as there is on the line of the canal.

14 Q. How long have you been engaged in running canal-boats?

A. About thirteen years.

97 15 Q. Have you run different kinds of boats—double and single?

A. I have.

16 Q. Now, as to your Hall boats as they have been altered. If the coupling chain were bolted in its centre to the rear part of the stem post of the rear boat and carried over to the claw-hooks on the front boat, without crossing in front of the stem post, would it operate any differently from what it operates on your boats?

A. It wouldn't centre the boats as close.

17 Q. Would it make any very material difference in respect to the centering?

A. No, sir.

18 Q. Does the coupling chain, as applied to your boats, operate any differently from what it would operate with a steering mechanism like that shown in model No. 16?

A. It would not.

Cross-examined:

19 Q. When did you first run a pair of coupled boats?

A. This summer two years ago.

20 Q. Were they the same pair you have just been talking about?

A. Same kind; not the same pair; another pair of the Hall boats.

21 Q. Both pair, then, had a notch in the stern of the forward boat before this last change two weeks ago?

A. They had.

22 Q. And both pair had the chain wheel, windlass, and gearing like Defendant's Exhibit No. 17?

A. Yes, sir.

23 Q. And that still remains so on the altered pair you referred to?

A. It does.

24 Q. Who made this alteration on those boats?

A. Elijah McCreary put it on there.

98 25 Q. Were you about when it was done?

A. I was right on the boat.

26 Q. When this alteration was made were the sheaves left the same as before on both the boats?

A. They were.

27 Q. How many sheaves were there altogether?

A. Four.

28 Q. Is the steering chain still fastened to the forward boat by claw-hooks, and was it so before?

A. It is, and was so before.

29 Q. You've been present while John Van Hyning was giving his deposition, have you?

A. I have.

30 Q. This pair of boats is the same pair he referred to, is it?

A. The same boats he was on last Thursday.

31 Q. You were with him on this trip he mentioned last Thursday?

A. I was.

32 Q. Then in these boats you've got the steering chain passing around the chain wheel as it did when you used the notch without the coupling chain?

A. I have.

33 Q. Don't that arrangement help to keep those boats centered, and didn't it do so when you had the notch instead of the coupling chain?

A. It does not.

34 Q. Don't that give you, through the steering chain, a direct purchase on the centre of the rear boat?

A. It does not.

35 Q. Why not?

A. Because when you tighten up on one side of the chain it pulls from the centre of the rear boat to the quarter of the front boat.

99 36 Q. The chain wheel is the central point in this pull, is it not?

A. Yes, sir.

37 Q. Now, when you put the coupling chain on those boats after filling up the notch, didn't the pull from this chain-wheel centre keep the coupling chain slack all the time when the boats were in line?

A. It did not.

38 Q. Did it do so except when you had it tightened up so close as you could get it?

A. The boats would move from the centre and tighten one or the other chain often—take up the slack on one side or the other.

39 Q. Do you mean the slack of the coupling or the steering chain?

A. The coupling and the centering chain.

40 Q. In these boats you have, then, two points of centering, haven't you—the stem post to which the coupling is attached and the chain wheel as you have stated?

A. The chain wheel don't help to center the boats.

41 Q. Don't the steering chain extend from the center of the rear boat forward to two points on the deck or quarter of the forward boat, just as the coupling chain extends from the stem of the rear boat to two points on the deck or quarter of the forward boat?

A. Not the same as the coupling chain.

42 Q. Why don't the steering chain help to center the boat just as the coupling chain does if both have central point on the rear boat from which they diverge to the forward boat?

Q. Because they don't run in the same direction.

43 Q. Don't they both run from a central point on the rear boat to points on the quarter of the forward boat?

A. The coupling and centering chain runs from the center
100 of the hind boat on the bow, and the other, centering further back, about five feet, therefore won't hold the boat to a center as well as the coupling and centering chain does.

44 Q. Did you ever see a pair of boats with both steering and

coupling chains without the steering chain passing around the chain wheel?

A. I have seen canal-boats that have no chain wheel on; I mean like the Pennsylvania Canal Company's boats.

45 Q. When Elijah McCreary made this change in your boats, two weeks ago, what was his object?

A. He did not tell me.

46 Q. Were the claw-hooks that hold the steering chain on those boats on the boat when you first began to run it?

A. Yes, sir.

47 Q. When was that?

A. On the 6th April, 1876, this pair of boats.

48 Q. Were the same kind of claw-hooks used for holding the steering chain on the other pair of boats that you ran?

A. They was.

49 Q. When was that first?

A. Spring of 1874.

50 Q. Was that the first you had seen of these Hall boats?

A. It was not.

51 Q. How long have you known these boats to have been running?

A. About five years.

52 Q. Have they had these claw-hooks for holding the steering chain on them all the time?

A. I could not say.

53 Q. Can you say how long since you first saw these claw-hooks on the Hall boats?

A. Over two years since I first took notice of them.

101 54 Q. When Elijah McCreary put this coupling chain on your boat, where did he get the claw-hooks for the coupling chain?

A. I could not tell you.

55 Q. Are there any McCreary boats amongst those you know of that have not the chain wheel on them?

A. There is not any that I know of.

56 Q. Was the coupling chain on your boat crossed from the start or was it crossed after you started to run when the alteration was made?

A. They were crossed when we first coupled them, and still remain so.

57 Q. Were they crossed for the purpose of taking up the slack?

A. They were crossed to keep the boats on the centre.

58 Q. When you used the coupling chain as tight as you could hook it, how much did you shorten it up from what it was at other times?

A. Generally used it about the same place.

59 Q. Then when it was hooked up as tight as you could hook it, you still had two or three inches of slack?

A. I never tried to hook it up tight. I would have two or three inches slack so that it would give one or two inches each side.

60 Q. Did the boats actually touch when in line?

A. They did.

61 Q. What held them up together?

A. The steering chain.

62 Q. Then this universal joint was formed by the steering chain bringing the boats in contact, wasn't it?

A. The steering chain brought the boats in contact. I don't know that it formed a universal joint.

63 Q. When the boats were actually in contact, wasn't the play laterally limited by the amount of slack you had on each side of the stem in the coupling chain?

102 A. That is correct.

64 Q. If you tightened up the coupling chain so that it would keep the boats in actual contact, touching each other, you wouldn't have any slack, would you?

A. No, sir.

65 Q. Then you wouldn't have any lateral play, would you?

A. You couldn't hook that chain without having a little slack.

66 Q. Then you can't hook it so that it alone will keep the boats in actual contact?

A. I can hook it so that either one chain or the other will be tight, which will keep the boats in contact.

67 Q. If the steering chain kept the boats in contact, there couldn't be any great strain on the coupling chain, could there?

A. There is not any heavy strain on the coupling and centreing chain.

68 Q. Have you ever run any coupled boats except these Hall boats?

A. I have not.

69 Q. How is this coupling chain fastened on the stem of your boat aside from the crossing of it?

A. With a bolt through a link into the stem at the backside of the stem.

70 Q. What difference do you observe between the working of these boats since they were altered and their working when they had the notch without the coupling chain?

A. I can fetch them around the curve shorter as they are now and keep them centered better.

72 Q. Did Elijah McCreary make any experiment, as far as you know, in this coupling arrangement without having the chain pass around the wheel, but only through the sheaves?

A. Not that I know of.

103 73 Q. Then you haven't seen them worked with a steering chain and coupling chain and system of sheaves and a windlass like the arrangement on this model No. 16?

A. I have not seen the boats worked with a drum and a coupling chain.

Redirect:

74 Q. In running these boats since they were altered have you perceived any necessity for having the claw-hooks attached to springs?

A. I have not.

75 Q. What is the length of the links in that coupling chain?

A. About two inches and a half.

76 Q. Would it be practicable to hook that chain up so tight that it would not have from two to three inches slack?

A. It would not be necessary; it would not be practicable.

77 Q. What is the length of the link in the steering chain?

A. I think about two inches.

78 Q. Could you hook that up so tight that it would have no slack?

—. We can by putting the boats at an angle.

JAMES A. DODSON.

Sworn and subscribed before me this 17th day of May, 1876.

SAMUEL BELL,
Special Examiner.

JOHN MCCREARY, being duly sworn, deposes and says:

1 Q. What is your name, age, residence, and occupation?

A. John McCreary; I am 46 years of age; residence, Middletown, Pennsylvania; occupation, boat-builder.

2 Q. Do you know how many pairs of boats were ever built and rigged according to Frick's patent?

104 A. There was three pairs, to my knowledge, named "Tide-Water," "Etter, Siple, and Carmony," and "Wm. P. Jenks."

3 Q. Were any of those boats altered at your yard; and, if so, what ones?

A. Two pair of those boats I altered and put the steering mechanism as shown in Exhibit J, J, J, No. 16, excepting the overhanging guard or bumper, which had a notch instead of the centering and coupling chains, as on said model. The rigging taken off of these boats weighed twenty-six hundred (2,600) pounds.

4 Q. What did that rigging consist of when taken off?

A. A flexible cross-bar and standards, and irons fastened on the deck that the flexible cross-bar had its sweep on. The sheaves we took off and placed back; that it carried the chain and steered from the wheel, the same as on Exhibit J, J, J, No. 16.

5 Q. How much of that weight, the 2,600 pounds, was due to the coupling bar, its standard, and the iron it rested on?

A. About twenty-two hundred (2,200) pounds. The cost of it was one hundred and fifty (150) dollars, as first placed, while on the boats I built for the Hall Brothers, of Baltimore, the machinery and steering mechanism weighed five hundred and fifty (550) pounds and cost thirty-one dollars.

6 Q. On the Frick boats was not there an equal amount of machinery independently of the coupling bar, its standards, and the iron it rested on to that you put on the Hall boats?

A. What we left on equaled the same machinery in weight as would be used on Exhibit J, J, J, No. 16, and would nearly equal the weight required on the steering mechinism on one of the Hall boats. I got those weights and prices at the machine shop that

made the machinery for one of these boats I altered for Mr. Frick, and also made the machinery for me for the Hall Bros. & Co. boats, of which I have a bill of the cost and weight.

105 7 Q. How would the cost of the steering machinery you left on the Frick boats compare with the cost of the machinery on the Hall boats?

A. The cost of the machinery left on the altered boats would be some less than cost of the machinery on the Hall boats; a difference of about ten (10) dollars. The overhang that we cut off the altered Frick boats weighed at least one thousand pounds, lightening the boats to that amount of weight, besides the machinery and steering apparatus.

8 Q. How long have you been engaged in running and building canal-boats?

A. I commenced canaling in 1849, or earlier. Since 1850 I have been engaged in building and con-tracting boats.

9 Q. Do you regard yourself an expert in rigging and running canal-boats?

A. I am. I claim that I am perfectly familiar with the business.

10. Referring to your reissued patent, No. 5630, would it, in your opinion, make any difference in the operation of the coupling chain "D" if it crossed in front of the stem of the rear boat in the manner that it crosses in the Hall boats, recently altered, as testified to by Van Hyning and Captain Dodson?

A. It wouldn't make the least difference in the operation of the boat.

11 Q. Where were you when this alteration was made?

A. I was at home at the time sick. I couldn't be present. It was put on by my direction.

12 Q. In your opinion would the coupling chain "D" operate any differently in connection with steering mechanism like that shown on model 16 from the way it operates on the Hall boats as altered, as testified to by Captain Van Hyning and Captain Dodson?

A. It would not; they are one and alike.

106 13 Q. When was the first pair of the Hall boats run on the canal the first time?

A. In and about April, 1871.

14 Q. Had it the claw-hooks on at that time?

A. Yes, sir; they were put on at that time.

Adjourned until 10 o'clock, Thursday, May 18, 1876.

THURSDAY, *May* 18, 1876—10 o'clock a. m.

Present: Mr. Coombs, Mr. Baldwin, and Mr. Shearer.

Cross-examination of JOHN MCCREARY:

15 Q. You are the complainant and the patentee under reissue No. 5630?

A. I am.

16 Q. What was your idea in substituting the coupling chain "D" in that patent for the notch of the preceding E. & J. McCreary patent?

A. I believe it to be an improvement and had spoken of it at the time of building and coupling the Hall boats and that it performed the same as the notch and would be better.

17 Q. Why didn't you apply it to use in some of your boats as a substitute for the more troublesome arrangement requiring you to make a notch?

A. My brother and I had consulted and agreed on the notch, and I told him that I believed the chain would be preferable for coupling and centering to the notch and would yet ask for a patent as an improvement, and have since got it.

18 Q. Why didn't you test that improvement some time during the several years that have elapsed since you have devised it?

A. Since the Pennsylvania Canal Company is building all the boats for the transportation of freight on the Pennsylvania canals and individuals getting no boats to build to which I could
107 apply this invention of coupling and centering chains, I had no opportunity to apply it; but the Philadelphia and Reading, supplying their own boats, gave me some pairs to build, and I showed them my two modes of coupling and steering, and they said they would adopt the notch, having heard that it was a success and a good thing, and having no other chance I couldn't apply it since.

19 Q. You knew about Frick's boats, with the coupling bar, before you invented this improvement, didn't you?

A. I did, and saw them.

20 Q. What did your improvement on the notch system include beyond the coupling chain "D"?

(Objected to, as the patent itself is the best evidence of what that improvement consists of.)

(Question withdrawn.)

21 Q. Up to this time you have never applied your improvement to a pair of boats with the sheave and windlass arranged exactly as described in your patent No. 129,844?

A. I claim that I have applied it as shown and described in patent No. 129,844.

22 Q. Do you mean in the pair of boats Van Hyning and Dodson spoke about?

A. Yes, sir.

23 Q. Isn't that the only instance up to date?

A. Yes, sir.

24 Q. Does your patent No. 129,844 say anything about attaching the ends of the coupling chain or holding them by claw-hooks?

(Objected to because the patent itself is the best evidence of what it says.)

A. It does, and the patent shows it.

25 Q. Show us where.

A. I refer to the third paragraph, which says my invention re-

lates to certain improvements, &c. After mentioning the first
108 improvements, goes on to say: "Second. In attaching the ends of the coupling chains to one of the boats by means of crow-foot claw-hooks so as to render the chain easily adjustable, as herein shown and described." I also refer to the second claim in said patent and figure 2 of drawing.

26 Q. Don't that patent, both in the specification and second claim, describe and specify the chain "*a*" as the chain which has the ends held by claw-hooks?

A. It does, and it is a mistake.

27 Q. Does it anywhere refer to the similar attachment of the chain "D"?

A. It does refer to the coupling and centering chain, but does not designate it by the letter "D."

28 Q. How does it designate it?

A. By the letter "*a*."

29 Q. Does it call "*a*" a coupling and centering chain?

A. It is called a coupling chain, but I do not find the word centering anywhere in the patent.

30 Q. Is the chain "D" anywhere in the patent designated as a coupling chain or as a steering chain or as a centering chain or as a coupling and centering chain?

A. The last clause in the 5th paragraph clearly describes the chain "D" as performing the functions of coupling and centering, but neither of said words, coupling or centering, are used in that clause, and I don't find that the letter "D" is used anywhere in connection with those woods.

31 Q. When the patent says, "The coupling and steering chain is attached to the forward boat by slipping one of its links edgewise between the claws of the crow-foot," does that refer to the chain "D" or the chain "*a*"?

(Objected to on the ground that the patent is the best evidence of its purport and meaning and cannot be varied by parole evidence.)

A. Complainant's counsel suggests that the witness may
109 decline to answer the question or answer it, as he pleases. The witness declines to answer the question.

32 Q. How does that patent show the ends of the chain "D" to be attached to the forward boat?

A. To a claw-hook or crow-foot, with the link slipped in edgewise.

33 Q. Where is the claw-hook shown?

A. At figure 2, marked "*h*."

34 Q. Is the claw-hooks marked "*h*" on Fig. 1?

A. Yes, sir.

35 Q. At the ends of the chain "D"?

A. At the ends of the chain designated "D" on the drawing.

36 Q. Look at that again and see if it is true.

A. That is the way I understand it to be marked.

37 Q. Isn't the mark you refer to, "*h'*"?

A. I don't understand what "*h'*" means.

38 Q. Isn't there a figure 1 added to the "*h*" at each of those ends of the chain "D"?

A. It is.

39 Q. Don't that show the point of attachment and not the mode of attachment of those ends of the chain "D"?

A. It shows the point of attachment, and I believe it shows the mode of attachment as I wanted it to be shown in the specification.

40 Q. How is the chain "D" connected with the hind boat in that drawing?

A. The specification states, in the 5th paragraph, that the central part of the chain "D" is linked to the cut-water or to a central point of the forward part of the rear boat, the said chain being so attached to the forward boat as to have a little slack.

41 Q. Question repeated.

A. The drawing shows it from the central part of the cut-water on the bow of the rear boat.

42 Q. How does the drawing show the chain "D" to be
110 attached to or connected with the rear boat?

A. I am not a draughtsman, nor have I any knowledge of drawing, and can't describe it any closer than I have in the other answer.

43 Q. Did you file a model in the Patent Office with your application for that patent?

A. I did not on the original application. No model was required. On the reissue I filed a model, which is precisely as model J, J, J, No. 16.

44 Q. When did you alter the 2 pair of Frick boats?

A. In the spring or summer of 1871.

45 Q. Why didn't you put your chain "D" on those boats?

A. I had mentioned it to those captains of the boats altered. They said the notch was so good that they wanted nothing else.

46 Q. How many sheaves did the steering chain pass over on those boats before you altered them?

A. I don't know, for the reason that Mr. Frick altered his boat and put on an increased number of sheaves from what shown in the drawing of his patent.

47 Q. Do you mean that when you altered those boats you put on the steering rig just as it is shown in the model J, J, J, No. 16, or did you use the chain wheel as is shown in defendant's model No. 17?

A. The same as is shown in model J, J, J, No. 16, except the notch instead of the coupling chain.

48 Q. When you say that your steering mechanism on the Hall boats weighed 550 pounds do you mean the rig as shown in the patent 125,684?

A. Yes, sir; all except the chain. I have since got a bill which shows that the correct weight was 518 pounds instead of 550 pounds.

49 Q. What was the length and weight of the chain?

A. The length of chain is about 70 or 80 feet of $\frac{7}{16}$ iron,
111 and weighs about 200 pounds, as near as I can tell. I don't know exactly.

50 Q. Does not the rig on model No. 16, your patented plan, cost more than the rig in the patent No. 125,684?

A. No, sir; it will cost less.

51 Q. There was nothing new in overhanging guards at the time you devised this plan, was there?

A. No, sir.

52 Q. Did you ever use a rope instead of a chain for either of these rigs?

A. No, sir.

53 Q. Would a rope work on either of these rigs?

A. A rope might answer.

54 Q. Do you think it would answer practically?

A. Not as well.

55 Q. You have referred to the patent No. 5630, and saying you regard yourself as an expert in running and rigging canal-boats, and have said it wouldn't make the least difference in the operation of the boat if the coupling chain "D" crossed in front of the stem of the rear boat, as described by Van Hyning and Dodson. Don't you agree with them that crossing the chain makes the boat centre better?

A. I believe the boats coupled by crossing in front of the stem and coupled as shown in drawing of patent 5630 or centered on stem as shown in 5630 would be one and alike for coupling and steering.

56 Q. Do you understand the drawing of this patent 5630?

A. I am not accustomed to drawings and know little about them. I would understand in the drawing, in part, those figures and letters to describe the patent I don't understand.

57 Q. As a boat-builder don't you work from plans or drawings?

A. No, sir; we work from moulds set by ribbons and the eye.

112 58 Q. Did you make the model that was filed with the application for this reissue?

A. I made the model; it had the top rigging made by a man working in iron, by my directions.

59 Q. Does that drawing represent that model?

A. That drawing represents model J, J, J, No. 16, and also the model in the Patent Office, except a slight difference that you notice, shown on J, J, J, 16, at the stern of the rear boat, where chains centre, but I consider them one and the same.

60 Q. Is the chain "D" on the model in the Patent Office fixed like the figure 1 in the drawing?

A. The difference is the same, as stated in the previous answer.

61 Q. How is the chain "D" connected with the rear boat in this drawing of patent 5630?

A. To the central part of the cut-water, with a pin going through one of the links.

62 Q. Don't the chain in the drawing pass through the cut-water?

A. That has always been a question to me. It may be considered as such by this drawing.

63 Q. Were these claw-hooks that you and your brother had on the Hall boats in 1871 new to you at that time?

A. Yes, sir.

Redirect examination:

64 Q. In your original patent No. 129,844 was there not several mistakes in the specification, by referring to different parts, by using letters differing from those shown in the drawing?

(Objected to as incompetent, the witness having been instructed by his counsel not to answer a cross-question referring to that patent, and, having declined thereupon to answer a cross-question,
113 it is not competent for him to go into that specification upon re-examination.)

(Counsel for complainant replies that the cross-question which he advised the witness that he might answer or decline answering was a question calling for the meaning of a certain clause in the specification. The question he now asks the witness calls for no interpretation of the specification, but simply calls for the fact whether or not there were mistakes in that specification, but does not call for any explanation from the witness as to what would be the meaning of the specification if those facts were corrected, the object being merely to prove that there are mistakes in the specification.)

(Defendant's counsel insists upon the objection, and objects further to the question in view of the explanation of its purpose just given; further, that it is leading, and that an answer to it would involve a contradiction of several preceeding answers given by this witness to the effect that he don't understand the drawing or what the lettering means.)

A. I will say that I can explain the drawing, but not by the letters; to the question I would just say yes.

(Answer objected to on the same grounds as the objection to the question.)

65 Q. Were those mistakes corrected in reissue No. 5630?

(Objected to for the same reasons assigned under the last question.)

A. They were.

(Answer objected to as before.)

66 Q. You have said that an overhanging guard was not new when you built the Hall boats; was it new when Frick took out his patent No. 82614, in 1868?

114 A. It was not. I have known bumpers or overhanging guards for 35 years.

67 Q. You stated yesterday that the cost of the coupling and steering rigging on the Frick boat was about $150. Do you wish to make any correction?

A. The weight was 2,600 pounds and cost $220.55, besides the weight and cost of chain, which was equal to the chain I used on the Hall boats.

Recross-examined:

(Adhering to the objections stated, defendant's counsel puts the following question *de bene esse*:)

68 Q. Point out on the patent No. 129,844 every instance you can find of a letter in the specification referring to the drawings and differing from the lettering in the drawing.

A. On reviewing the patent I find that I was mistaken in regard to the discrepancies and was misled by my counsel.

(Counsel for complainant says that he acknowledges that he misled the witness, and it occurred in this way: When the specification in the original patent was shown him and the 5th clause of the original specification was pointed out to him, where it says, "These boats are coupled together by means of a chain or rope, '*a*,' the ends of which are fastened to the forward boat by means of claw-hooks on forward boat," he supposed, without critically reading the specification, that it was the coupling chain "D D" on the drawing that was referred to, and informed his client, then on the stand, that that was a mistake. He was led to this conclusion by the fact that throughout this examination this chain "D D" has always been referred to as the coupling chain and the other chain as the steering chain; but on carefully reading said original specification he finds that
115 the steering chain, marked "*a*," is called a coupling and steering chain, and in the clause just quoted its function of coupling only is mentioned.)

JOHN McCREARY.

Sworn and subscribed before me this 18th day of May, 1876.

SAMUEL BELL,
Special Examiner.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY.

No. 66. U. S. C. C., E. D. of Penna. Oct. Sess., 1873.

Depositions of witnesses taken before J. W. Hamilton Johnson, notary public in and for the District of Columbia, on behalf of complainant in the above cause, at the office of J. J. Coombs, Esq., No. 639 F street, Washington, D. C., at 11 o'clock a. m., on the 6th day of September, 1876.

WASHINGTON, D. C., *Sept.* 6, 1876.

By consent of counsel, Wm. B. Uupperman is permitted to take these proofs as clerk for the notary, having been first duly sworn according to law to well and truly take down questions and remarks of counsel and the answers of the witnesses, and I hereby certify that the said Wm. B. Uupperman was so duly sworn according to law.

[L. S.] J. W. HAMILTON JOHNSON,
Notary Public.

Present: J. J. Coombs, counsel for complainant, and Henry Baldwin, Jr., of counsel for defendant.

CHARLES H. WATSON, a witness on behalf of complainant,
116 being duly sworn to tell the truth, the whole truth, and nothing but the truth, deposes and says in answer to interrogatories:

Q. 1. What is your name, age, residence, and occupation?

A. Name, Charles H. Watson; age, 35 years; residence, Washington, D. C., and by occupation a patent attorney and mechanical expert.

2 Q. What experience have you had as an expert in patent cases that qualifies you to give testimony in such cases?

A. I am a practical mechanic and draughtsman; have had experience as an examiner in the Patent Office, and for about the past five years have been engaged in preparing specifications and drawings for the Patent Office and prosecuting applications before the same, and have also been engaged as attorney and counsellor in patent cases.

3 Q. Have you read and do you understand letters patent No. 129,844, Complainant's Exhibit No. 8, and also the reissue thereof, No. 5630, Complainant's Exhibit No. 9, in this case?

A. I have examined the said patent No. 129,844 and the reissue of the same, No. 5630, and believe I fully understand the construction and operation of the device described.

4 Q. Please examine model of a pair of boats marked Complainant's Exhibit No. 32, and state whether or not this model fairly represents the coupling and centering mechanism shown and described in said letters patent No. 129,844 and also in the reissue thereof, No. 5630.

A. I think it fully illustrates the operation of the invention as set forth and claimed in the said patents so far as relates to the coupling of the boats and centering of the same. Referring to the original patent and the reissue of the same, I find the construction substantially the same, the only difference being that in the reissue,
117 No. 5630, the coupling chain is set or secured at a more acute angle than in the original patent No. 129,844, being simply a matter of degree, the point of pivot upon the rear boat being the same in both cases. Referring to Complainant's Exhibit No. 32, I find two sets of dogs or crow-foots, which will approximate to illustrate this difference in the angles.

5 Q. In your opinion, will it make any difference in the practical operation of the boats whether coupled, as shown in the drawing of the original patent or as shown in the drawing of the reissue? Give your reasons for your answer.

A. In my opinion it would make no material difference, the requirements for centering the boat being that the chain or connection attached or pivoted to one of the boats should be as near the end of the boat as possible.

6 Q. You will observe that in the original patent and in the reissue it is specified that the coupling chain is to be so attached to the forward boat as to have a little slack. If coupled according to the drawing in the original patent and the chain drawn as taut as

practicable would it have anything more than a little slack within the meaning of the specification, as you understand it? Give your reasons for your answer.

A. As illustrated in the patents named and the description of the same, it is stated that the chain is to be left a little slack, which I judge to be sufficiently slack to allow the boats to assume any desired angle to each other and at the same time to remain centered, as I find the following description in the patent No. 5630: "D is a chain, the ends of which are attached to the rear overhanging guard H of the forward boat, at points *h' h'*, and the central part of which is linked to the stem or to a central point on the bow of the rear boat, the said chain being so attached to the forward boat as to have a little slack, but not enough to prevent the overhang-
118 ing bumper and the stem or cut-water from remaining at all times substantially in contact." I do not think that it would have any more than a little slack or sufficient to allow the necessary movement and at the same time hold the boat centered, as represented in the drawing of the original patent.

7 Q. Have you read and do you understand the contents of English letters patent to John Bourne, No. 1795, dated June 26, 1857, a copy of which is now shown you?

A. I have examined said patent and think I fully understand the same.

8 Q. Please examine model now shown you, marked Complainant's Exhibit No. 33, and state in how far that correctly represents the drawing of said Bourne's English patent, having reference to figures 1 and 2 of sheet 2.

A. Referring to Complainant's Exhibit No. 33, I find that there is shown therein two parts, supposed to represent two boats, having a coupling or connecting device attached at one point to one of the boats, and extending at an angle, and having an attachment at two points to the other boats. I find the said parts represented in a plan view as one being concave and the other convex, a vertical section of which is straight. I also find in said exhibit the steering apparatus, consisting of a windlass and two pulleys near the centre of one boat, and two pulleys and belaying pins near the outside of the opposite boat, with a cord or chain arranged as follows: One end of the cord or chain is fastened to the belaying pin upon one side of the boat having the concavity, passes around a pulley near the centre of the opposite boat, from thence around a pulley near the outside of the boat to which it is attached, then around the windlass, and then around two corresponding pulleys to those above mentioned on the opposite side, and the end fastened in a belay-
119 ing pin opposite to and upon the same boat, having the belaying pin above mentioned. To this end, and for all practical purposes, it is a substantial representation of figures 1 and 2, of sheet 2, of English patent 1795, of 1857.

9 Q. Do you find in the specification of said English patent and in the drawing anything in the nature of a universal joint between the two boats? Give your reasons for your answer.

A. I find in the specification of said English patent, in the first

claim, language as follows: "I claim as my invention the combination into an articulated or jointed train, in the manner described, of a steamer and one or more barges, the articulation being of the nature of a ball-and-socket joint, so as to permit both lateral and vertical motion." This is the only place I find the term ball-and-socket joint in the specification, and that refers to the motion of the boats and not to any specific device. I do not find a ball-and-socket joint shown or described in said patent. I find the specification describes a lateral and vertical motion, but I do not find any means described or shown by which such motions are accomplished or any universal motion whatever.

10 Q. In a pair of boats constructed according to said English patent would it be possible for the boats to careen, one to the larboard and the other to the starboard? Give your reasons for your answer.

A. It would not, for the reason that the boat having the one point of pivot for the attachment, has it so far away from the end of the boat and the rods connecting the two are so far apart that the boats could not careen at all in opposite directions, only as might be allowed from the looseness of the joints, which would not amount to anything in a construction like this without bending or breaking the rods connecting the two boats or their fastenings.

11 Q. Referring to complainant's patent No. 5630, do you
120 find in that patent mechanism which will allow the boats to careen in opposite directions? If so, explain what that mechanism is.

A. I find in complainant's patent No. 5630 that the boats are coupled together by chains, which are flexible in their nature, which would allow the two boats to careen in opposite directions when necessary.

12 Q. Referring to sheet 2 of Bourne's English patent, state what position the coupling bars A B occupy in respect to the main deck.

A. It is described in the specification as being attached to strong pins or spindles extending above the deck. I find by referring to figure 1, sheet 2, of said patent that the spindles extend sufficiently far above the deck to receive the bars, while the bars extend just sufficiently far above the deck to clear the rear portion thereof.

(Counsel for complainant here offers in evidence models marked Complainant's Exhibits Nos. 32 and 33.)

13 Q. By what kind of joints are the coupling bars A B, as shown in the drawing of said English patent, connected to the respective boats, referring to the specification and drawings?

A. The specification affords no description, only as follows: "The bars are attached to strong pins or spindles projecting above the deck." Referring to figure 2 of sheet 2, I judge that the spindle is provided upon one boat with a sleeve, through which the bar extends, and apparently extends through the spindle, and the attachment of the bar to the opposite boat appears of a corresponding form.

14 Q. What, if anything, do you find in the specification or draw-

ing of said English patent indicating that said bars are connected with the boats at either end by a ball-and-socket joint or anything in the nature of a ball-and-socket joint?

121 A. I do not find in the specification any language describing a ball-and-socket joint or anything of that character, nor do I find in the drawing any ball-and-socket joint shown. The joints, as illustrated, would admit of a lateral motion only of the boats, with the exception of the ordinary looseness of joints as before stated. The specification refers to vertical and lateral motion or to an articulation of the boats in the nature of a ball-and-socket joint, but I fail to find anywhere in said patent devices, either shown or described, that would admit of such motion to any practical extent.

15 Q. Do you find in the specification or drawing of said English patent any language which in your judgment excludes the idea that said coupling bars are to be attached to the boat by ball-and-socket joints? If so, refer to such language.

A. I find in the specification that it is stated that the bars are attached to strong pins or spindles extending above the deck. The mode of attachment is not stated. I find nothing further in the specification referring to the mode of attachment. Referring to the drawing, figure 2, plate 2, I find that it would be impossible for a ball-and-socket or universal joint to operate in all directions, for the following reasons: The point of attachment upon the forward boat is so far forward of the rear or after portion of the boat and the angle so great as it extends to the rear boat it would not allow the rear portion of the forward boat to rise independent of the forward portion of the rear boat without breaking the coupling or its fastenings. This proposition would be true in case a single bar was used, attached in like position as regards the ends of the respective boats, the bars being so close to the deck.

By consent of counsel adjournment was made at 1.15 p. m.

Met at 2.20 p. m. September 6, 1876.

122 Examination of C. H. WATSON resumed:

16 Q. Referring to figure 1, sheet 2, of Bourne's English patent, I perceive that the steering wheel is located upon the upper or hurricane deck, and from its drum the chain extends down vertically to the lower deck, while in complainant's model, Exhibit No. 33, the steering wheel is mounted upon the lower deck. State what difference, if any, this difference in construction would make in the practical operation of the steering mechanism.

A. Referring to Bourne's English patent, before cited, figure 1 represents a steamer provided with an upper or hurricane deck. Steamers are usually provided with one or two decks above the main deck, and the steering wheel is usually located upon the upper deck, in order that the pilot can more readily see where to guide his vessel. In Complainant's Exhibit 33 there is but one deck represented. There is no difference in the operation or manipulation

of the steering wheel wherever situated on the boat, the only thing being required is that the chains be of sufficient length and guided in proper position to reach the wheel.

17 Q. If the steering wheel was on the upper deck, as shown in the drawing of the English patent, what would be necessary, in addition to what is shown in Complainant's Exhibit No. 33, to guide the chain in proper position?

A. Absolutely there would be nothing necessary, as the number of pulleys used would be sufficient to guide the chain to the upper deck, but as represented, carrying the chain at right angles, one or more sets of pulleys would be required.

18 Q. State whether you find in the drawing of said English patent another set of pulleys represented.

A. I do not understand that there are any more pulleys used in said patent as it is represented.

19 Q. Referring to figure 1 of the drawing of Bourne's patent, please state what view is represented by that drawing.

A. A longitudinal vertical section.

123 20 Q. Now, referring to the point marked "*b*" in said drawing, state whether that shows the two adjacent ends of the boats being vertical from top to bottom and very near together, or otherwise.

A. I find that the two adjacent ends of the boats are vertical and are shown and described as being near together.

21 Q. The two adjacent ends of the boats being vertical and as near together as indicated by the drawing, what would be the effect of the rising of those two ends of the boats upon a wave upon the coupling bars?

A. It would either bend or break the coupling bars or their fastenings, as the coupling bars are represented close to the deck of the boat, and if the boats were raised any considerable distance the keel or bottom parts of the boats would strike together. The effect upon the coupling bar would be the same if the coupling bars were elevated above the deck, provided the boats were raised at their ends only.

22 Q. Do you find in said English patent described or shown any overhanging guard or bumper on the deck of either boat to keep the hulls apart?

A. I do not; the boats are kept apart by the coupling bar.

23 Q. Do you find in the specification of said English patent any words to limit the extent to which said boats are to be separated one from the other?

A. I find in the specification the following words: "Each convex end has, at the central point from which the convexity is swept, a strong pin, from which two rods or stays proceed to the outer edges of the contiguous concave ends, and these rods always keep the constituent barges of the train at the right distance apart and prevent them either from touching one another or from having too great a space between them." I find also in the specification the following: "It is quite immaterial whether the stern of the steamer is made concave or convex, and it is also immaterial whether the barges are

made alternately with two convex ends and two concave ends
124 or whetner there is one concave and one convex end to each, the only material point being that the articulation should be such as to enable the train to bend in any required direction without any considerable space being left between its constituent barges."

24 Q. Do you understand from the specification of said English patent that the boats in the train are to be united in any other manner than by the convex end of one boat fitting into the concave end of another boat?

A. I understand that in all cases where two boats come together, judging from the patent, that one end is to be concave and the other convex.

25 Q. State whether or not it would be practicable, according to the invention as described in said patent, to unite the two concave ends together, giving your reasons.

(Objected to as incompetent, requiring the witness to construe the invention described in Bourne's English patent and to testify as to matters of practical construction and possible construction as a matter of fact, while it does not appear that the witness has any knowledge of the practical construction of double canal-boats.)

A. In my opinion it would not be practicable, but would be absurd, to attempt to unite two boats together the adjacent ends both being concave, for the reason that the outer sides of each boat would present a sharp corner or, as it were, a cutting edge, which would come in contact with the opposite boat were either boat deflected, causing probable injury to both boats.

26 Q. Referring to the first claim of complainant's patent No. 5630, what do you understand by the term keeping the boats centered?

(Objected to as a reopening of complainant's case in chief and as incompetent, requiring the witness to construe the first claim of the patent.)

125 A. I understand the term keeping the boats centered to mean that when the boats are deflected the centre or stem of the rear boat shall be held in a line with the centre of the boat next preceeding it.

27 Q. In boats constructed and coupled as described and shown in Bourne's English patent would the boats remain centered in the sense you have just spoken of when deflected out of line in turning a curve?

A. The boats constructed according to English patent above referred to would not remain centered in the sense described when turning a curve, but their centers would be moved from each other the distance of an arc of a circle, corresponding with the deflections of the boats, the coupling bar forming the radia of the circle.

28 Q. What would be the effect in turning a curve in a narrow canal of this passing of the center in respect to the space the boats would occupy in the canal?

A. Each boat following another and so coupled would swing

toward the outer bank of the canal to the extent of the boats diverging from their centers, as described in answer to the preceeding question.

Cross-examined by HENRY BALDWIN, Jr., of counsel for defendant, reserving objections stated:

29 Q. Have you had any practical experience in the construction or operation of coupled canal-boats?

A. I have not in those coupled as shown by the exhibit here presented.

30 Q. Have you previous to this time examined this class of boats?

A. I have; the models and descriptions as shown in the Patent Office, but not full sized boats in operation.

31 Q. When did you first make an examination of the English patent 1795, of 1857?

A. I cannot state precisely the time when I first saw it,
126 but I do not remember of having my attention called particularly to it until, perhaps, two or three weeks ago.

32 Q. You say you have read and understand the McCreary patent, No. 129,844, and his reissue thereof, No. 5630, and fully understand the construction and operation of the devices described. Now, in the patent 129,844, how is the coupling chain "D" attached to the forward boat according to the specification or according to the drawing?

(Objected to as not cross-examination.)

A. According to the patent I find in the recital of invention that the boats are attached together so as to form a universal joint, and centering the boats by a chain attached at both sides to one boat and at its center to a central point on the adjacent end of the other boat; and in further description of the chain "D" I find the following: "D is a chain, the ends of which are attached to a rear overhanging guard of the forward boat at points *h' h'*, and the central part of which is linked to the cut-water or to a central point on the forward end of the rear boat," said chain being so attached to the forward boat as to have a little slack. "It is essential that the chain 'D' on the forward boat or the point of its attachment to the rear boat shall be on a projecting or overhanging guard or bumper (or both may be so placed), so that the connection will form a universal joint between the adjacent ends of the two boats and allow the boats to assume any angle in respect to each other, whether vertically or laterally, without coming in contact at any point except said point of connection." I do not find any discrepancy between the drawing and specification of this patent.

33 Q. Do you find it stated anywhere in the specification or shown in the drawing of the patent 129,844 how the ends of the chain "D" are attached to the forward boat?

A. I find the specification states that the two ends of the chain

are so attached to the forward boat as to have a little slack
127 The peculiar device by which they are attached is not especially described in the specification. The chains or ropes "*a*" are described as having a peculiar attachment called "claw-hooks," and represented as *h* in the drawing.

34 Q. Does the drawing show how the ends of the chain "D" are attached to the forward boat in the patent 129,844?

A. It is not clearly represented in this photographic copy I have before me.

35 Q. That is the same copy you had before you when you stated in chief that you fully understood the construction and operation of the device described, is it not?

A. It is the same copy, and I have no reason to change any answers I have heretofore made; but there is no peculiar construction of that device in the patent as describing how the ends of the chain "D" are attached, nor was I examined especially upon the construction of the same; but there is shown in the patent the attachment for the ends of the chain represented as the same size for a similar purpose, and this device is fully described and represented by an enlarged view of the drawing, and any mechanic might readily suppose that the ends of each chain had similar fasteners.

36 Q. For what purpose is this device you find represented or described?

A. It is described for fastening the forward ends of the chain to the rear end of the forward boat.

37 Q. Which chain has its ends fastened by this device according to the specification of the patent 129,844?

A. The chain called the coupling chain or rope, designated by the letter *a*.

38 Q. Is not this chain *a* designated throughout the specification and in both of the claims of patent 129,844 as the coupling and steering chain *a*?

A. Yes, sir; passing around the pulleys and windlass.

39 Q. Is the chain D designated in the patent anywhere as a coupling chain?

A. No, sir.

128 40 Q. Does not the patent specify the mode in which the chain *a* is attached and the purpose of that attachment?

A. It is described in the recital of invention as follows: "In attaching the ends of the coupling chain to one of the boats by means of crow-foot claw-hooks, so as to render the chain easily adjustable." I find further on the following: "The boats are coupled together by means of a rope or chain *a*, the ends of which are fastened to the forward boat by means of the claw-hooks *h h* on the said forward boat." This comprises the description in the specification of the said device, but figure 2 of the drawing represents an enlarged view of this fastening device, which I deem to be sufficiently clear to enable any mechanic to construct one like it.

41 Q. The purpose of this device is stated to be to render the coupling chain *a* easily adjustable, or, as repeated in the 2d claim,

for attaching and adjusting the steering chain *a*, substantially as described, is it not?

A. It is.

42 Q. If the coupling chain *a* was so adjusted that the stem of the rear boat was brought in contact with the stern or overhang of the forward boat, of what further adjustment would the coupling chain *a* be susceptible?

A. It could be lengthened out.

43 Q. If the coupling chain *a* was lengthened out, the chain D having a little slack, would the boats be kept in contact?

A. That would depend whether or not one of the boats was heavier loaded than another, or sat higher in the water. The object of the chain, as I understand it—I refer to the adjustability of it—besides steering or deflecting the boats, is to hold the boats sufficiently close together, and the chain or rope is used, or some material of flexible nature, so that the boats may be allowed to careen in opposite directions if necessary. Were the boats always equally loaded, or their decks or upper portions the same height, and the chain *a*
129 properly adjusted, I do not presume the chain would need further adjustment while the boats were in that condition.

44 Q. Does the patent state that the chain D is adjustable?

A. It does not; it states that it is so attached as to be left a little slack.

45 Q. Does the patent state that the chain D is attached to the forward boat by means of claw-hooks?

A. It does not.

46 Q. Does the patent state or show that the ends of the chain D are attached to the forward boat above the deck?

A. It states that the ends of the chain are attached to the rear overhanging guard of the forward boat. The drawing shows (in Fig. 1) a top view of two boats; these two boats are represented by a single outline; the chain D is represented in said Fig. 1 of drawing as being attached to the top of the boat.

47 Q. Does not the patent state that the ends of the chain D are attached to the rear overhanging guard of the forward boat at points *h' h'*?

A. I have so stated in my preceding answer, without referring to the points *h' h'*. It is stated in the specification that they are attached at the points *h' h'*.

48 Q. Does not the drawing show those points of attachment, *h' h'*, at the extreme end of the overhanging guard of the forward boat?

A. Points *h' h'* are at the extreme rear upper portion of the top of the boat, as represented in the drawing.

49 Q. In the reissue No. 5630, which you have also said you fully understand, both as to construction and operation, is not the stem of the rear boat shown in actual contact with the stern of the forward boat?

A. As nearly as can be represented by a drawing.

50 Q. In patent 129,844 the stem and stern of the boats are not in contact, are they?

130 A. There is a slight opening between the lines representing the stem of the rear boat and the rear portion of the forward boat.

51 Q. In the reissue 5630 are not the points of attachment of the ends of the chain D considerably forward of the extreme end of the overhanging guard?

A. They are forward of the rear portion of the rear part of the boat, but not to any considerable distance, as indicated in the question.

52 Q. Are they not so much nearer together in the reissue than in the original as substantially to vary the angle between the ends and the stern of the rear boat?

A. They are not shown to be only that much nearer than the thickness of two chains. The angle of the chain is varied, but I do not think substantially so, so as to affect the operation of the device, as I have before testified.

53 Q. Are not the ends of the chain D in the reissue 5630 so much further forward than in the patent 129,844 that the claw-hooks are even with the rear end of the claw-hooks which hold the coupling chain *a*?

A. The forward part of the chain is about on a transverse line with the rear part of the claw-hook to which the chain *a* is attached.

54 Q. Are not the claw-hooks which hold the coupling chain *a*, in the reissue 5630, further forward on the deck than in the patent 129,844?

A. The distance, as represented in the drawing, between the claw-hooks and the ends of the boat is greater than that in patent 129,844, but I observe that the drawings are not on a scale, and it would be impossible to calculate accurately the distance or size of any of these drawings as represented.

55 Q. Are not the pulleys on both boats further forward and back on the deck in the reissue than in the patent 129,844?

A. In the reissue No. 5630 the pulleys marked *f* appear to be a little nearer the forward end of the rear boat than those in
131 patent 129,844, while the pulleys marked *e* appear to be set further back than in patent 129,844; but I notice the pulleys marked *e* in both drawings are nearly opposite that point where the forward part of the rear boat commences to curve, while the pulleys *d* appear to be set further forward in patent 5630 than in patent 129,844.

56 Q. In the reissue 5630 is not the stem of the rear boat considerably more prominent than in 129,844; does it not extend further forward?

A. As represented in the different-sized drawings, it does.

57 Q. Is not the distance greater between the pulleys on the rear boat and the extreme rear end of the forward boat in the reissue than in the original patent?

A. I do not think there is any material difference, taking the size of the two drawings into consideration. This answer is given to the best of my judgment, with both drawings before me.

Adjourned at 5 o'clock until Thursday, September 7, 1876.

Met at 9.30 a. m. Thursday, September 7, 1876.

Cross-examination of C. H. WATSON resumed by Mr. BALDWIN:

58 Q. Would it make any difference in the operation of the chain D whether its ends were fastened to the forward boat upon or below the deck?

A. If it was fastened so far below the deck upon the forward boat as to interfere with swinging the rudder to one side when the boats were coupled I think it would make a material difference. At any point above that I presume the operation would be substantially the same, while at the same time it is apparently more convenient to have it on the top of the deck.

59 Q. In this model, Exhibit 32, is the chain D fastened to the stem of the rear boat above or below the deck?

132 A. I should say it was on a line with the deck of the boat.

60 Q. Is the point of attachment on the rear boat above or below the overhanging guard or bumper of the forward boat?

A. It is just that much above the deck or overhanging guard of the forward boat as is required for the thickness of the metal forming the dogs or claw-hooks, and a slight projection on the upturned dogs or claw-hooks to allow the chain to be held by said claw-hooks—that is to say, the claw-hooks are fastened upon the top of the deck or overhanging guard.

61 Q. In the Bourne patent, 1795, do you find shown or described any bar connected at the apex of the triangle or point of traction, as is the iron bar in this model, Exhibit 33?

A. They are not connected in the same manner as to mechanical construction, but I believe, upon careful examination of the drawing, Fig. 2, plate 2, and Complainant's Exhibit 33, that the operation would be substantially the same in both cases.

62 Q. Do you as draughtsman, mechanic, or expert understand or believe that this flat, rigid bar, screwed down to the decks, as in this model, Exhibit 33, fairly represent- or even illustrate- the operation of the bars, with ball-and-socket joint, described in the Bourne patent?

(Counsel for complainant objects to question upon the ground that there is no ball-and-socket joint connecting said bars at either end with either boat described in the specification or shown in the drawing of said English patent, and this witness has so testified.)

A. In English patent 1795, of 1857, my former testimony will show that there is no ball-and-socket joint described, and even if there was one or three at the points of attachment of the bar in said English patent it would be impossible for the same to operate in all directions as a ball-and-socket joint, the attachment being at

133 the points illustrated in Figs. 1 and 2, plate 2, of said English patent. I further stated in my former testimony that the specification described a vertical and lateral movement, and that

also the first claim stated that the articulation was in the nature of a ball-and-socket joint, or words to that effect, and also explained why it was impossible that such vertical motion could be obtained in regard to one boat in view of the point of traction of the single bar, except such as is allowed by the looseness of an ordinary joint, and also why it would be impossible for the ends of one or either of the adjacent boats to rise vertically to any considerable extent, owing to their vertical construction and their close proximity to each other.

63 Q. Don't this flat bar, screwed down as it is in the model, Exhibit 33, prevent vertical motion?

A. It does, except as to the slight motion that might be allowed by the looseness of the joint.

64 Q. Don't the English patent, 1795, in the bottom line of page 1 and top line of page 2, say that the train "is composed of a steamer and train of barges articulated to one another by circular joints, so as to admit of lateral and vertical deflection"?

A. It does; and I have so stated in a former answer, and quoted the exact language used in the question.

65 Q. Does not the patent 1795, on page 4 (printed copy), show "that the same species of apparatus is employed to deflect the last barge of the train, and also all or any of the intermediate barges, and this apparatus may be exchanged for any equivalent deflecting apparatus producing a similar result?

A. It does; but the deflecting apparatus refers only to a lateral motion, and not in any manner to a vertical motion. There is no apparatus shown or described by which a vertical motion of the ends of the boat is effected, unless it be the description of the paddle-wheels used in raising the boat when going over a bar or shallow place in the water, or a substitute for such device under the like circumstances.

134 66 Q. Does not this patent state, on page 5, "the only material point being that the articulation should be such as to enable the train to bend in any required direction without any considerable space being left between its constituent barges"?

A. It does; I have so stated, and quoted the exact language in a former answer.

67 Q. In the English patent 1795, does not the check-chain M keep the boat centered?

A. No, sir.

68 Q. Why not?

A. Because, if the check-chain was drawn sufficiently tight to keep the boats centered and used with the coupling-bar, as shown in said English patent, there could be no lateral deflection whatever. The use of the check-chain, as shown in said English patent, is for the purpose of limiting the movement of the barges or the centers of the barges from each other, so as not to cause the points or sides of the barges E E to jam against each other. The reason for the above is that were the check-chain M drawn tightly it would hold the center of each adjacent boat from moving laterally from each other, when used in connection with the angular bar attached at

two points on one boat and at the point A upon the adjacent boat, the said point A being the point of pivot and being so far removed from the end of the boat as not to allow any lateral movement whatever in case the two boats were firmly attached at their centers.

Re-examined by Mr. COOMBS:

69 Q. Referring to complainant's patent 129,844, Exhibit No. 8, and to the reissue thereof, No. 5630, Exhibit No. 9, please state whether there is any representation in either of said patents that the drawings are made to a scale.

135 A. There is not.

70 Q. About what proportion of American patents are issued with drawings made to a scale, in your judgment?

A. It is impossible for me to state what proportion there is made to a scale, but it is my opinion that there is not one in fifty drawn to a mechanical working scale.

71 Q. In the discrepancies between the drawing of said original and said reissued patents as to proportions and the location of claw-hooks and pulleys, which you pointed out yesterday, do you find any such variation between the two drawings as would make any practical difference in the operation of two pairs of boats constructed according to said drawings respectively?

(Objected to as incompetent.)

A. I believe the description in the reissue patent describing the invention and claims would refer to one drawing as well as to the other.

72 Q. Have you examined the original drawing on file in the Patent Office, of patent 129,844; and, if so, please state whether you find the point of attachment of the chain "D" more clearly shown than in the printed copy attached to the patent, and state the reasons why they are more distinctly shown.

(Objected to as incompetent and not the proper way to prove what is in the original drawing, which would speak for itself, or by certified copy, which should be produced.)

(Counsel for complainant states that he has ordered a certified copy of said drawing, which he will put in evidence this day, and he so notified counsel for defendant immediately before he made the foregoing objection.)

(Counsel for defendant replies that the facts remain; that
136 in the meanwhile the witness is asked about the drawing, which is not here, and which, therefore, defendant's counsel cannot refer to or cross-examine the witness respecting on the cause.)

(Counsel for complainant states that the question is put now to save time, but the certified copy of the drawing shall be produced before the witness is dismissed, and counsel for defendant will have an opportunity to cross-examine him thereon; otherwise the testimony on this point will be withdrawn.)

A. I have carefully examined this day in the U. S. Patent Office the original drawing of patent No. 129,844, and desire to make an explanation in regard to my testimony given yesterday in regard to the attachment of the chain marked D in said patent. I believe I stated in substance in my testimony that in the copy of patent 129,844 the drawing was on so small a scale and the attachment of the ends of the chain D being under the chain *a*, and that as the description in said patent did not describe the exact construction of said attachment, I could not tell exactly its form; but in the original drawing of said patent in the U. S. Patent Office, which I have examined, as before referred to, I find that the ends of the chain D are fastened in the same manner as the ends of chain *a* in said patent 129,844.

73 Q. State whether or not the points *h h* in the drawing annexed to said original patent are represented as being claw-hooks in the specification.

A. They are; and figure 3 of drawing is described as a detached view of the same.

74 Q. State whether or not the points marked *h' h'* in said drawing are so represented on the original drawing in the Patent Office, to which you have referred, as to substantially indicate that they are the same devices shown at *h h*.

137 (Objected to as incompetent, the drawing itself being the best evidence.)

A. As before stated, the original drawing, patent 129,844, on file in the Patent Office, represents that the ends of the chain D and the ends of the chain *a* have the same attachment.

75 Q. You stated, in answer to a question on cross-examination, that the iron coupling bars shown in Complainant's Exhibit 33, screwed down flat upon the deck, would present vertical deflection. In this respect what difference is there between the location and position of said bars in said Exhibit 33 and Bourne's English patent as represented in the drawing?

A. In Exhibit No. 33, the point corresponding to the point marked A in said English patent I believe to be a little nearer the end of the boat than in said English patent. The points, however, are in the center of each boat, the only difference being that the bars in English patent are a little larger in proportion than the bars in Complainant's Exhibit 33. So far as relates to the bars being close to the deck or bearing upon the rear portion of the same, the devices are the same in English patent and Exhibit No. 33.

Recross-examined by Mr. BALDWIN:

76 Q. In the English patent 1795 are the bars A B underneath the steering ropes as they are in this model, Exhibit 33?

A. They are not; but the rear portion of the boat is shown in Fig. 1, plate 2, in said exhibit to be slightly elevated above the deck, so that the said bars A B rest upon said elevated portion, while the steering chain apparently appears to be at a point below the bars.

Fig. 2 of plan 2 represents the steering chain or rope in dotted
138 lines over all parts of the boat, and, the view being a top or plan view, it is impossible to tell its location in regard to a vertical line.

77 Q. Do you understand from the patent 1795 that the pulleys around which the steering rope passes in Fig. 2 are above the deck so high as to admit of the bars A B being arranged to work under the steering rope, as represented in this model, Exhibit 33?

A. As before stated, Fig. 2, plate 2, of English patent is a plan or top view, and the pulleys at the points E E are represented as just outside the boat, and from such view I cannot tell to what height they may or may not be elevated above the boat; but the chain or rope itself in said Fig. 2 is certainly on the top of the deck. I have explained the position of this steering chain or rope to the best of my ability in regard to location in answer to a previous question in referring to Fig. 1, plate 2, of said patent.

78 Q. Please measure and state the angle of division between the bars A B in the patent 1795 and the same angle in the bar on Exhibit 33.

A. To the best of my ability to measure them with the instruments before me, I believe the angle of the bar in Exhibit 33 substantially the same angle as that shown in English patent 1795. It is possible that the angle of the bar in Exhibit 33 is a trifle more obtuse, but not enough to make any practical difference, in my opinion.

79 Q. I asked you for the angle, and not for the substantial resemblance in your opinion, and repeat my request that you will measure and state the angle in each case, as nearly as you can, in degrees.

A. Witness replies that he will have diagrams made of each, and testify in regard to the same upon any points upon which he may be called. Since making the above answer I have made an accurate calculation of the bars referred to, No. 1795, of 1857, English
139 patent, and Complainant's Exhibit No. 33, and I find the angle of the bar in the English patent to be an angle of 79 degrees, while the angle of the bars in Exhibit 33 is an angle of 80 degrees.

Re-examined by Mr. COOMBS:

80 Q. Did you make or have made a diagram representing the different angles shown in the English patent and in Complainant's Exhibit No. 33? If so, please produce it and put it in evidence.

A. I did have made such diagram, measured it myself, which I now produce and which is marked Complainant's Exhibit No. 34.

81 Q. Please explain what lines represent the bars as shown in the English patent and in Complainant's Exhibit No. 33.

A. The diagram marked Exhibit 34, in the diagram marked English patent 1795, the radial lines on either side of the vertical radial line and marked respectively 140, 220, represent an angle of 80 degrees. The heavy dotted line on the inside of the line marked

220 and the line marked 140, being an angle of 79 degrees, represents the angle of the bar in said English patent. In the other or large diagram the lines marked 140 and 220 represent the angle of the bars in Complainant's Exhibit No. 33.

82 Q. Referring to Fig. 2, of sheet 2, Bourne's English patent, what does the line marked C on the stern of the steamer represent?

A. The steering chain.

83 Q. State whether or not that is represented by dots or short sections throughout its entire length.

A. On the boat it is represented in dotted lines.

84 Q. What do you understand to have been the object in representing it thus?

(Objected to as incompetent.)

140 A. In practice in mechanical drawing a chain when represented as very small is represented by dotted lines, as is also that portion of an outline that is desired to be represented, but covered by some other part.

85 Q. If said chain was intended to be represented as lying under the bars A B, would it properly have been represented as crossing said bars in the same form as it is shown throughout its entire length?

(Objected to as leading an- argumentative and as having been already answered by the witness in substance.)

A. Referring to Fig. 2, plate 2, the lines being represented in dotted lines upon the boat and nearly full lines on the outside of the boat, it is impossible to state exactly the correct position of the chain in a plan view like that shown.

(Complainant's counsel offers in evidence diagram marked Complainant's Exhibit No. 34; also certified copy of the drawing of J. McCreary's patent No. 129,844, dated July 23, 1876, marked Complainant's Exhibit 35; also printed specification and drawing of Jno. Bourne's English patent No. 1795 of 1857, marked Complainant's Exhibit No. 36.)

C. H. WATSON.

V. D. STOCKBRIDGE, being duly sworn according to law, doth say in answer to interrogatories propounded him by J. J. COOMBS, counsel for complainant:

1 Q. What is your name, age, residence, and occupation?

A. V. D. Stockbridge; 39 years; Washington, D. C.; examiner-in-chief in the Patent Office.

2 Q. Please state what experience you have had in the examination of inventions and patents.

A. I have been particularly concerned with the examination of applications for patents during the past eight years,
141 in the capacity of assistant examiner, principal examiner, and examiner-in-chief.

3 Q. Please state whether, while a principal examiner, you had charge of that class of inventions relating to the building and navi-

gation of boats; and, if so, during what time you had charge of that class.

A. I did have charge of that class as principal examiner from June 24, 1872, to May 17, 1875.

4 Q. Please state whether you, as assistant examiner, examined the application upon which letters patent to Elijah McCreary and John McCreary, No. 125,684, dated April 16, 1872, was granted.

(Objected to as irrelevant, said patent not being involved in this case.)

A. I cannot swear positively whether I personally examined the application upon which patent 125,684 was granted, but my impression is that I did so. I could not state positively without examining the files.

5 Q. Please look at original patent to John McCreary, No. 139,844, dated July 23d, 1872, and state whether, as examiner or assistant examiner, you examined the application upon which said patent was granted.

A. The same answer that I gave to previous question will apply to this. I could not state positively without examining the files.

6 Q. Please examine the reissue of the patent last mentioned, No. 5630, and state whether, as principal examiner, you examined that application.

A. I have examined the reissue sufficiently to state that I did examine the application upon which it was granted.

7 Q. Can you state whether you allowed that reissue, as a principal examiner?

A. I either did so in person or it was done with my approval.

142 8 Q. Do you recollect whether, when said application for reissue was under examination, your attention was called to the English patent of John Bourne, No. 1795, of 1857?

(Objected to as incompetent and irrelevant.)

A. I will state that I am uncertain as to whether this may or may not have been cited as a reference, but it was a case well known to me at the time the reissue patent was allowed, and said allowance was made in view of or with a full understanding of what was contained in that patent.

9 Q. Can you state whether at the time of the allowance of said reissue you were familiar with the English patent of Peter Taylor, No. 11044, of 1846?

A. I cannot tell from the name and number without an inspection of the patent.

10 Q. Will you please examine English patent of John Bourne and state whether you find described in the specification or shown in the drawing anything in the nature of a universal joint connecting the constituent boats of the train?

A. I find in the specification the following language: "* * * and trains of barges articulated to one another by circular joints so as to admit of lateral and vertical deflection. * * *" I also find

in the claim the following language: "* * * the articulation being of the nature of a ball-and-socket joint, so as to permit both lateral and vertical deflection. * * *" There is illustrated in the drawings a series of boats or barges in train, the contiguous ends of which are concave and convex, so as to fit into each other and, permit of a lateral swinging or articulation between them. The contiguous ends appear to be in all of the figures vertical or nearly so. These boats or barges are shown and described as being connected together or coupled by means of rods or bars secured to and swinging around a bolt or stud upon one of the boats at the center, upon which the curve of the concave and convex ends are struck. I do not understand that this connection will operate as a universal or ball-and-socket joint. To explain: Should there be a great
143 depression of the extremities of any pair of these boats or a considerable relative elevation of the contiguous ends, the boats would jam or crowd and there could not be an articulation in that direction. I see no reason why the construction will not permit of an articulation in all other desired directions.

11 Q. In boats constructed and coupled as described and shown in said English specification and drawing could the two boats careen in opposite directions?

A. I do not think they could in the direction as indicated in the last answer without crowding.

12 Q. Could they careen sideways—in opposite directions?

A. As I understand the question now, it is as to whether they could roll in opposite directions. In answer I would say that as illustrated they could not to any considerable extent, because of the relative short distance apart and of the vertical concave and convex faces being so near together.

13 Q. What would be the effect of the coupling bars A B, the same being rigid bars and lying upon or very close to the deck, in respect to the rolling or careening of the boats in opposite directions?

(Objected to as assuming that the bars A B are rigid bars and lie close to the deck or upon it, whereas the patent states that they are jointed bars, and does not state that they lie upon or close to the deck.)

(Counsel for complainant waives the question for the present and puts the following question:)

14 Q. State whether or not the bars A B, as described in the specification and represented in the drawing, are in your judgment rigid bars, and whether or not they lie upon or close to the main deck.

A. As represented in figures 1 and 2 of sheet 3 I should say that the bars A B are single in themselves and therefore rigid—
144 that is to say, I see no joint or place of flection in either one of the bars A B. I would further state that by reference to figure 1 the bars as there represented appear to be either directly upon or very near the deck or plane of the top of the boat.

15 Q. Now, assuming that the bars are rigid and lie upon or very near the deck, please answer question 13.

A. The effect would be to prevent the careening of the boats in

opposite directions or it would break the bars or some of the connections.

16 Q. By what kind of joints do you understand from the specification and drawings said bars A B to be connected with the decks of the respective boats?

By consent of counsel adjournment made at 1.40 p. m. until 2.25 p. m., September 7, 1876.

Met pursuant to above adjournment.

Examination of V. D. STOCKBRIDGE resumed:

A. I understand from the drawing and from the description here given that the bars or rods A B are pivoted to the boat at the point A, which is called the "centre A." It is impossible for me to determine how they are pivoted; but so far as I can tell the bars pass into or through a mortice in a post, but I would say that the manner of pivoting is indeterminate. They are connected at the other end, apparently, by means of clamps and a projecting stud, the bars being connected to or with the clamp, although the specification says, "The attachments of the draw-bars at A and B B consist of strong pins or spindles projecting above the deck of the steamer at A and the deck of the barge at B B." This description agrees with it and is consistent with the drawing in this regard as understood by me.

17 Q. Do you find anything in the specification or drawing of said English patent indicating that the bars A B are connected with either boat by ball-and-socket joints?

145 A. I find nothing in the drawing that would indicate that they are so connected, and nothing in the specification except the general claim that the barges or the steamer and one or more barges are connected so that the articulation thereof shall be in the nature of a ball-and-socket joint.

18 Q. Do you understand the language you have just referred to as saying that the bars A B are connected with the boats by anything in the nature of a ball-and-socket joint, or as relating to the concave and convex articulation of the boats themselves?

(Objected to as leading and as cross-examining the witness upon his answer to the same question just previously put and answered.)

(Counsel for complainant requests the witness to give his reasons for any answer he may make to the foregoing question.)

(Counsel for defendant repeats objection.)

A. From an inspection of the drawing there is nothing therein shown to indicate a ball-and-socket connection of the bars A B at either end; and, the language of the claim referring to an articulated or jointed train, to which it may in fact reasonably apply, I should say that the words * * * "the articulation being in the nature of a ball-and-socket joints" * * * refers to the articulation of the boats rather than to the articulation of the bars upon or around their connections with the boats or either of them.

19 Q. Please state whether or not the concave and convex con-

nection of the adjacent ends of the boat do operate in the nature of a ball-and-socket joint, so far as lateral deflection is concerned.

(Objected to as assuming that there is any concave and convex connections of the adjacent ends of the boat.)

A. The means of connection permits of a lateral deflec-
146 tion as well as and to that extent the same as a ball-and-socket joint.

20 Q. Please state whether a pair of boats constructed and coupled in accordance with said Bourne's English patent would remain centered in turning a curve in the sense required by the language of the first claim of complainant's reissued patent, No. 5630.

(Objected to as incompetent and requiring the witness to construe the first claim of the reissue 5630.)

(Counsel for complainant requests the witness to give his reasons to any answers he may give to the foregoing question.)

(Objection repeated by counsel for defendant.)

A. It would not. In the reissued patent of J. McCreary, referred to, the medium line running fore and aft of the boats is that in which the pivot or turning point exists, while the turning point in the Bourne patent is in advance of the rear boat or the barge, within that which constitutes the tug—that is to say, a flexure according to the Bourne plan would be upon a center within one of the boats and outside the other, while in the reissued patent, referred to, the flexure would be on a medium line running fore and aft and at the point of contact between the boats.

21 Q. Referring to original patent No. 129,844 and to the certified copy of the original drawing thereof on file in the Patent Office, now shown you, marked Complainant's Exhibit 35, please state whether or not, in your judgment, the said drawing substantially indicates that the chain "D" is attached to the forward boat by the same means as chain *a* at point *h h*.

(Objected to as leading and as incompetent.)

A. I should say, from the drawing alone, that the connection
147 of the chain *a* with the boat at *h* is dissimilar to the connection of the chain "D" at the point h^2, although the connection of the chain "D" at h^2 is obscured in the drawing by the representation of the chain *a*, which is represented above said connection h^2.

22 Q. If you examine the drawing in connection with the specification what would be your opinion on the point?

A. There is nothing in the specification by which to certainly determine what is the means of connection at h' h^2 of the chain "D," the reference to the chain "D" and its means of connection in the specification being: "The said chain being so attached to the forward boat as to have a little slack."

23 Q. Do you find described in the specification or shown in the drawings of said original patent any other means of attaching either chain to the boat except crow-foot claw-hooks?

A. I do not find any other.

24 Q. In view of the fact that only one means is described and shown in the patent of connecting said chains or either of them to the boats, and of the fact that the means so described is a crow-foot claw-hook, do you or do you not think it reasonable to infer that the devices shown in the drawing at *h' h''* were intended to be the same as those shown at point *h h*?

(Objected to as leading, as argumentative, and as assuming that only one means is described and shown in the patent of connecting said chains or either of them to the boat, and as assuming that the crow-foot claw-hook shown in Fig. 2 as the means by which the chain *a* is attached on the deck of the boat where the claw-hook stands upright would answer for attaching to the ends of the chain D to the rear overhanging guard of the forward boat at the point *h' h''* where it is impossible to say what would be the position of such claw-hooks.)

148 A. I understand the crow-foot claw-hook to be either a novel or unusual method of securing a chain for the purpose of connecting boats, and that I find to have been particularly described in the patent. I do not, therefore, deem it unreasonable to assume that the connection of the chains *a* D were or might be the same, although, according to the description, the coupling of the chain D might be by any known or convenient means.

25 Q. Were you employed as an expert in this case or did you come here under a subpœna?

A. I came here in compliance with a subpœna and without knowing in what case or the subject-matter of my examination.

Reserving the objection taken, Mr. BALDWIN cross-examines as follows:

26 Q. Do you observe that the second claim of the patent 129,844 is simply for the claw-hooks *h h* for attaching and adjusting coupling and steering chain *a* in combination with the subject-matter of the first claim, and would you not deem it reasonable to infer that if the chain D was to be similarly attached it would have been similarly specified and designated in the claim and in the specification and represented in the drawing, especially in the absence of a model?

A. If it were intended to have been made a part of the claim it is reasonable that it should be referred — in the specification, and before a claim would be allowed such description would ordinarily and properly be required.

27 Q. Please look at Fig. 1, sheet 2, of Bourne's patent 1795, and at the bow of the rear boat, under the letter B. Do you not find a hook over which the end link of a chain is thrown?

A. I do.

28 Q. Is not that hook with the chain over it the full mechanical equivalent of the claw-hook *h* in the patent 5630, with the chain in the fork of it?

149 A. In both cases they are hooks, and, broadly considered, are equivalents of each other, but the claw-hooks shown in Fig. 2 of the reissued patent, while serving equally as well as a hook, permits of the removal or unhooking of the chain and its readjustment with a facility not common to the hook shown in the Bourne patent.

29 Q. Why would it be harder to raise the link over the hook shown in Bourne's patent than out of the fork of the claw-hook shown in reissue 5630?

A. The chain, in order to be taken from the hook in the Bourne patent, must first be slackened, bent, and lifted, in order to detach it. In the other case of the reissued patent it is possible to raise and unhook the chain without any bend whatever in the chain and while the same is taut. It may be, while taut, thrown out of engagement by means of a lever, while, in the other case, the chain could not be so detached.

30 Q. In the Bourne patent, 1795, do you find described and represented a series or a pair of boats coupled together?

A. I do.

31 Q. Is the one boat so coupled to the other that both can be steered from one?

A. It is.

32 Q. Is there a windlass on one boat, sheaves or pulleys on both, and points of attachment for the ends of the steering rope, which rope passes from one boat to the other around the sheaves and the windlass?

A. There is.

33 Q. Is there, in addition to this steering mechanism, the coupling-bar connection between the two boats, which you have so fully discussed in chief?

A. There is.

34 Q. Is there in addition also a check-chain, which is fastened at the bow of one boat and at the stern of the other, so as to prevent the boats from swinging too far laterally?

150 A. There is.

35 Q. Suppose that the rear boat in the Bourne patent—the one next the steamer, I mean—had both ends convex and was still connected with the steamer by the means described in the patent—that is, the steering mechanism, coupling bar, and check-chain, would there be any difficulty in that case in the boats having all the lateral and vertical deflection usually incident to canal navigation?

(Objected to on the ground that it suppose- and asks the opinion of the witness upon boats constructed and coupled in a way entirely different from that shown or described in the English patent.)

A. The vertical deflection in canal navigation between the tug and the barge is considerable—that is, the difference between the draught of a loaded and a light barge that is about four feet, and by the connection shown in the Bourne patent such difference in the draught of the barge would probably create a considerable strain

upon the draw-bars if it did not break them. The draught of the tug being constant, that is substantially so. The lateral deflection is provided for in the Bourne patent, whether the forward end of the following boat be convex, as supposed, or concave, as described in the patent, when the boats are coupled together, according to the draught, at a given time, the deflection usual in canal navigation not being very great, it is probable that the plan proposed by Bourne might be practiced to some extent.

36 Q. Does not the Bourne patent show and describe a train of the barges connected with each other in the same manner that the front barge is connected to the steamer, and would the same difficulty exist between two of these barges as you have stated in respect to the steamer and the barge?

A. The same answer given to question 35 will apply to this.

151 37 Q. In the patent 5630, if the forward boat was four feet higher than the rear boat, or if one boat was loaded and the other light, so that there was four feet difference between the levels of their decks, don't you think the chain D would be broken or its fastenings torn off if it had not more slack given to it than is compatible with keeping the stern and stem of the boats in or substantially in contact?

A. It undoubtedly would be strained or broken unless adjusted to suit the difference in the draught of the two contiguous boats.

38 Q. If so adjusted, and yet the stem of the rear boat and the stern of the forward boat still kept in contact, would not the lighter boat and the higher actually carry the lower and heavier boat?

A. The draught would operate to draw upward or sustain to some extent the weight of the lower boat.

39 Q. Is not all this theory of a universal joint in the reissue 5630 comprised in the simple phrase, a flexible connection between the boats?

A. The phrase, a flexible connection between the boats, is broader than the phrase universal joint or universal joint coupling, and, as the greater will contain the less, it is so comprised within that phrase.

40 Q. Is not the theory of actual contact between two coupled boats, as described in the reissue 5630, irreconcilable with the theory of vertical and lateral deflection?

A. I do not understand that it is.

41 Q. If the coupling chain D is so taut as to keep the boats in actual contact, will they not thereby become practically one boat, and the steering chain be necessarily so slack that it cannot operate the boat?

(Objected to on the ground that the patent does not state
152 that the boats are to be kept in actual contact, but, on the contrary, that the chain D is to be so adjusted as to have a little slack.)

A. If, according to the supposition, the chain D is kept so taut as to hold the boats, while moving, in actual contact, there would

be a stiffness or rigidity which, upon a vertical flexure, would bend to strain or part the boats, but I do not understand that the steering would be essentially affected whether the boats be in actual contact or within a few inches of each other.

42 Q. If the stern of the forward boat and the stem of the rear boat are not in actual contact, how far apart could they be and still remain substantially in contact, according to the reissue 5630?

A. Under the meaning of the term or word contact two or more bodies must touch each other, but as understood by the patent 5630 substantially in contact is intended within, practically, a short distance, and not actual contact.

43 Q. Would this short distance be practically less than the distance prescribed by Bourne as to be maintained between his boats?

A. Probably not.

44 Q. If the boats in the patent 5630 are not kept in actual contact by the chain D they must be kept substantially in contact by the steering chain, must they not?

A. They must be kept there by something if they are so kept at all; as understood, they are to be kept in juxtaposition by either or both of the chains *a* and D.

45 Q. If the chain D has a little slack must not the chain *a* do all the holding in juxtaposition?

A. One or the other of the chains must hold, of course, if there is any tendency of one boat to part from the other.

46 Q. In the patent 5630 is there any way of taking up slack of the chain D or the chain *a*, except by adjusting the ends of the chains in the claw-hooks?

153 A. I know of none.

Adjourned at 5.40 p. m., September 7, 1876, until 10 a. m., Friday, September 8, 1876.

FRIDAY, *Sept.* 8, 1876.

Met pursuant to adjournment.
Counsel and witness present as before.

Redirect examination by Mr. COOMBS:

47 Q. By cross-question No. 35 your opinion was asked as to how the boats described in Bourne's English patent would operate in respect to having lateral and vertical deflection if the barge next to the steamer had both ends convex, and was connected with the steamer by the means described in that patent. Please state whether you find in said patent anything to show that the patentee contemplated ever connecting two convex ends of the boats in a train together.

A. I do not.

48 Q. In answer to cross-question 35, you referred to the effect of Bourne's coupling when two adjacent boats should be loaded differently, so that one would sink much lower in the water than the other; now, suppose the boats were so coupled that two convex ends should come together, both having the vertical walls shown in Bourne's draw-

ing, what would be the effect, if the contiguous ends of the boats thus coupled should both rise on a wave or swell, upon the coupling bar A B?

A. The bars A B would be strained or broken, in addition to a tendency to crush the hulls of the impinging boats.

49 Q. If the boats were so connected that two convex ends should come together, as supposed by said cross-question 35, could the boats careen or roll in opposite directions to any considerable extent without bending or breaking said coupling bar?

154 A. They could not.

50 Q. Referring to your answers to cross-questions 42 and 43, I ask you the following question: When the boats described in McCreary's patent (reissue 5630) are so coupled as to keep them within a short distance of each other, but not in actual contact, so that the distance between them would probably not be practically less than the distance described by Bourne as to be maintained between his boats, please state what points on the McCreary boats would be thus near together.

A. The overhanging or rearwardly projecting guard of the forward boat and the cut-water or stem of the rear boat.

V. D. STOCKBRIDGE.

JOHN MCCREARY, being duly sworn as a witness in his own behalf, doth say, in answer to interrogatories propounded to him by J. J. COOMBS, Esq., counsel for complainant, as follows:

1 Q. Are you the complainant in this case, and have you heretofore testified?

A. I am; and have heretofore testified in this case.

2 Q. What is the ordinary width of canal-boats on the Pennsylvania canal?

A. The majority of boats running on the main line of Pennsylvania canal are fifteen feet six inches, and some sixteen feet.

3 Q. What is the ordinary width of the canal at the bottom?

A. The Pennsylvania Canal Company, in the enlargement, made the canal thirty-two feet at bottom. In extreme narrow places, where there was rock cutting, they made the canal thirty feet wide at bottom.

4 Q. Usually the banks slope inward from the top to the bottom, do they not?

A. Yes, sir. I can't give the slope, but the canal varies in
155 width from near fifty to sixty feet, and in shoal places it may be much wider, from the overflow; I mean the water surface is from near fifty to sixty feet.

5 Q. State whether you regard it important that coupled boats should be kept centered. And, if so, why?

A. It is very important that coupled boats should be centered, for the reason that when passing boats and bridge abutments and locks that the boats should align each other that they may not come in contact with the same.

Cross-examined by Mr. BALDWIN:

6 Q. What is the meaning of keeping coupled boots centered?

A. The same is shown in Exhibit No. 32, the chains centering at the stem or cut-water of the rear boat and centering to the opposite quarters of the forward boat on the rear end to crow-foots.

7 Q. What centering is there between the coupled boats to maintain them in alignment with each other?

A. I call two boats centered when the stem of the rear boat is in a central position to the stern or overhanging guard or bumper of the forward boat. What I mean by "alignment" is when the rear boat tracks or follows in the line of the forward boat in that manner.

JOHN McCREARY.

156 J. J. J. No. 1.

Circuit Court of the United States for the Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } In Equity.

SIR: You are hereby notified that on the tenth day of September, 1875, the complainant in the above-entitled cause, at 10 o'clock a. m., will proceed to take testimony of James M. Blanchard, Charles L. Coombs, John McCreary (the complainant), and others before John J. Johnson, Esq., examiner in chancery, at No. 342 D street, in Washington, District of Columbia, and that the proceedings will be continued from day to day, if necessary, until the examination is completed.

J. J. COOMBS,
Counsel for Compl't.

Theo. Cuyler, Esq., counsel for def't, Philadelphia.

157 J. J. J. No. 2.

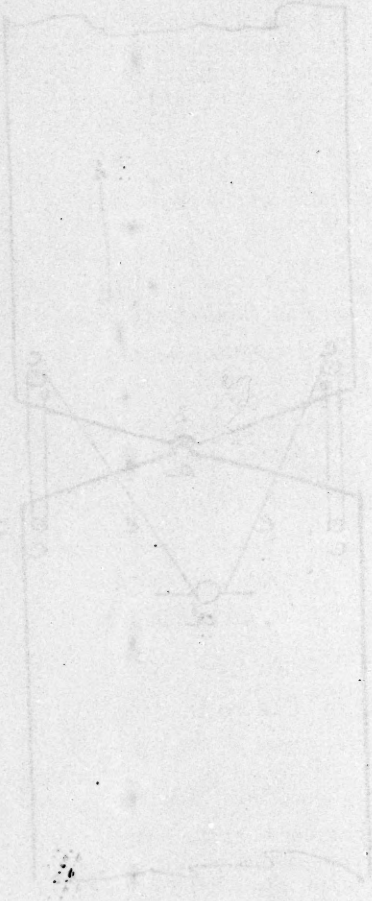
In the U. S. Circuit Court for the Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } In Equity.

It is hereby stipulated and agreed that the testimony in this case may be taken before any United States commissioner or examiner in chancery in Washington or in Philadelphia by either party on reasonable notice to the opposite party.

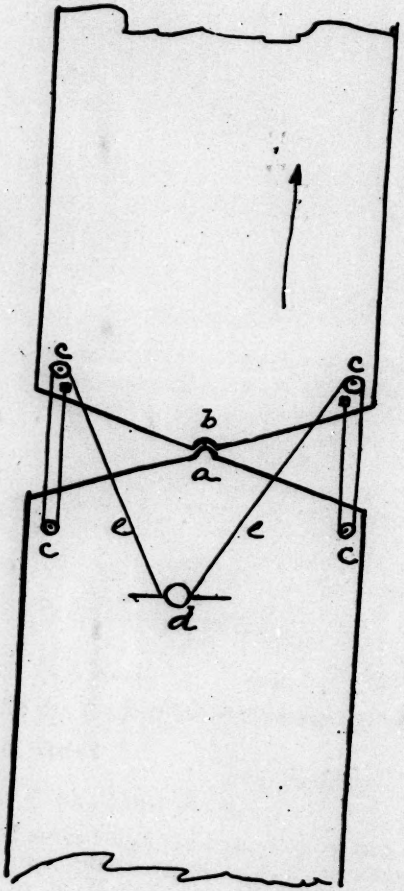
Aug. 12th, 1875.

J. J. COOMBS,
For Compl't.
THEO. CUYLER,
For Def't.



L. L. L. No. 5.

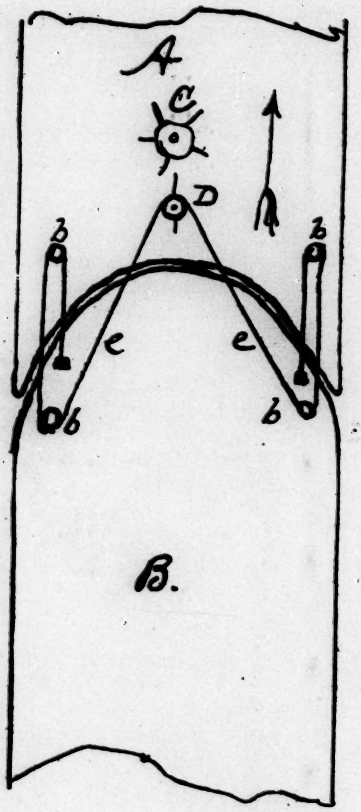
No. 368.
McCreary
v.
Pa. Canal Co.
p. 160



"Experiment"

F. F. I No. 6.

No. 368.
McCready
v.
Pa. Canal Co.
} p. 161.



Eighteenth Amendment

158 EXHIBITS.

J, J, J, No. 3.

CANAL DEPARTMENT, PA. R. R. CO.,
ENGINEER AND SUPERINTENDENT'S OFFICE,
HARRISBURG, *May* 21, 1870.

E. & J. McCreary, boat-builders, Middletown.

GENTLEMEN: The president of the Tide-Water Canal Company writes me that their company will allow a section boat built to carry 200 tons or more freight to pass over their canal at half tolls for two years, the boat to be operated as one boat in passing through their canal.

Operating the boat in that way on the Tide-Water Canal, our company will allow such section boat to pass over the Pennsylvania canal, or any portion thereof, for the space of one full boating season free of tolls, or for two years at half tolls, as you may prefer, the boat to be built and put into operation as early this season as possible, not later than the first of August next.

I have not yet learned what the Wisconisco Company will do, but have reason to believe they will grant you, in some form, an abatement of tolls to encourage your enterprise. I shall, at the first opportunity, urge their co-operation with us.

On receipt of this please let me know whether you go on with the building of the boat or not, and what abatement of tolls or freedom of the use of the canals you will expect of the Pennsylvania Railroad Company—whether tolls free for one year or half tolls for two years.

Yours very truly, THOS. T. WIREMAN,
Engineer and Superintendent.

159 J, J, J, No. 4.

MILLERSBURG, *June* 23, 1860.

Jno. McCreary, Esq.

DEAR SIR: Mr. Gratz, president of the Wisconisco canal, was here yesterday, and I requested Mr. Merrick to see him in relation to your new boat, and he said, in my presence, that anything the other canal companies would do for you in tolls he would do also.

Yours respectfully, J. MILLER.

(Here follow diagrams marked pp. 160 & 161.)

162 J. J. J. No. 7.

THE U. S. PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Elijah and John McCreary, dated April 16th, 1872, No. 125,684, for "improvement in steering devices for canal-boats, &c."

Seal Patent Office, United States of America.

In testimony whereof I, J. M. Thacher, acting Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this ninth day of August, in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States the ninety-seventh.

J. M. THACHER,
Acting Commissioner.

163 No. 125,684.

THE UNITED STATES OF AMERICA.

To all to whom these presents shall come:

Whereas Elijah McCreary and John McCreary, of Middletown, Pennsylvania, have presented to the Commissioner of Patents a petition praying for the grant of letters patent for an alleged new and useful improvement in steering devices for canal-boats, &c., a description of which invention is contained in the specification, of which a copy is hereunto annexed and made a part hereof, and have complied with the various requirements of law in such cases made and provided; and

Whereas, upon due examination made, the said claimants are adjudged to be justly entitled to a patent under the law:

Now, therefore, these letters patent are to grant unto the said Elijah and John McCreary, their heirs or assigns, for the term of seventeen years from the sixteenth day of April, one thousand eight hundred and seventy-two, the exclusive right to make, use, and vend the said invention throughout the United States and territories thereof.

[L. S.] In testimony whereof I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the city of Washington, this sixteenth day of April, in the year of our Lord one thousand eight hundred and seventy-two, and of the Independence of the United States of America the ninety-sixth.

B. R. COWEN,
Acting Secretary of the Interior.

Countersigned.
M. D. LEGGETT,
Commissioner of Patents.

165 125,684.

UNITED STATES PATENT OFFICE.

ELIJAH MCCREARY and JOHN MCCREARY, of Middletown, Penna.

Improvement in Steering Devices for Canal-Boats, &c.

Specification forming part of Letters Patent No. 125,684, dated April 16, 1872.

To all whom it may concern:

Be it known that we, Elijah McCreary and John McCreary, of

E. & J. McCREARY.

Improvement in Steering Devices for Canal Boats.

No. 125,684. Patented April 16, 1872.

Fig. 1.

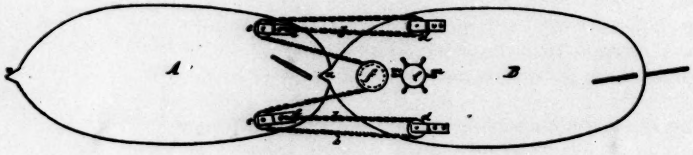
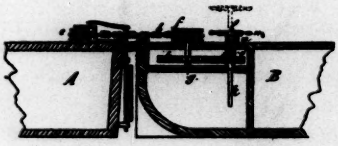


Fig. 2



No. 368.
McCreary
&
Pa. Canal Co
} p. 164.

Witnesses:

H. J. Stretz
Thos D. D. Owen

Inventor:

E. McCreary.
J. McCreary.

Per [illegible]

Attorneys.

Middletown, in the county of Dauphin and State of Pennsylvania, have invented a new and improved coupling and steering device for canal-boats, barges, &c.; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing making a part of this specification, in which—

(Here follows diagram marked p. 164.)

Figure 1 is a top view, and Fig. 2 is a longitudinal sectional elevation.

This invention relates to boats, barges, scows, or any kind of craft suited for use on smooth water and coupled together, a vertical groove being formed in the stern overhanging guard or bumper of the forward boat, which groove is entered by the cut-water of the hinder boat, a chain being used for connecting the boats, which chain is so connected with a train of gear-wheels placed in the hinder boat as to enable both boats to be steered by means of a windlass connected with the aforesaid train of gear-wheels, and hence moving the chain so as to turn the forward boat to either side.

Referring to the drawing, A is the forward boat, the same having a groove in its stern overhanging guard or bumper. B is the hinder boat, whose cut-water *a* enters the aforesaid groove. *b* is a chain, both whose ends are fastened to the boat A at the points *c*, from which points the chain runs back to and around horizontal sheaves *d* secured to the deck of the boat B, from which sheaves the branches of the chain extend forward to and around horizontal sheaves *e* secured to the deck of the boat A, and from the sheaves *e* the chain runs back to and around a chain-wheel, *f*, secured to the deck of the boat B, near the bow thereof. The chain-wheel *f* is placed upon a vertical shaft, *g*, which extends downward through the deck of the boat B, and bears near its lower end, beneath said deck, a spur-gear, *h*, Fig. 2, which engages with a spur-gear, *i*, placed on a tube, *j*, that extends parallel to the shaft *g* through the deck, which tube incloses a sliding bar, *k*, that bears a wheel, *l*, at its top, said disk being armed with handles *m*. The tube *j*, bar *k*, and wheel *l* together form a windlass, by means of which the gears are turned through the instrumentality of the handles *m*. The rotating of the gears *h i* effects the turning of the chain-wheel *f* and the consequent drawing of the chain so as to turn the front boat to either side, the movements of the front boat governing those of the rear boat. Thus both boats are steered by one man stationed at the wheel *l*. The bar *k* is made sliding, in order that it may ordinarily be raised high enough to bring the wheel *l* within convenient reach of the steersman, and, when bridges are to be underrun, to be lowered so as to put the wheel out of danger of hitting the same. A set-screw, *n*, enables the bar *k* to be fastened at any required height.

It will be seen that by placing the notch into which the projecting cut-water fits in an overhanging guard at the stern of the boat, as is shown and described, the two adjacent ends of the boats, at whatever inclination to the horizon they may lie in the water, can never come in contact except at that point, the said cut-water and

notch forming a universal joint which allows the boats to assume any angle to each other, either vertically or laterally, without separating at said point of contact. It will also be seen that our coupling-chain performs the double service of coupling and holding the boats together and steering them, no other coupling device being used.

We are aware rafts have been so connected with a steering boat or barge, by means of a rigid pivoted bar and a cord or chain, as to allow of an operation in some measure analogous to that displayed in our invention.

We are also aware that an English patent was granted to one William Hammond Bartholomew, in 1862, for a device for steering a train of boats, coupled together, by means of a chain passing around a windlass on the rear boat and extending to the forward boat, and each boat in the train having a projecting cut-water on its forward end, fitting into a vertical groove in the stern of the next forward boat, from the deck to the bottom of the boats; but said boats were not coupled and held together by means of the chain alone, nor did the chain pass around a system of pulleys to increase the power applied to the steering-windlass.

Having thus described our invention, what we claim as new, and desire to secure by letters patent, is—

166 1. Two boats or barges, A and B, fitted together by means of a projecting cut-water fitting into a notch in an overhanging guard, as described, and coupled and steered by means of a chain or rope, having its ends fastened to the forward boat and passing around pulleys *d d e e* and the wheel *f*, substantially as herein set forth.

2. In combination with the subject-matter of the foregoing claim we also claim the chain-wheel *f*, the steering-wheel *l m*, the pinion *i*, the bar *k*, and tube *j*, all combined and arranged to operate substantially as described.

ELIJAH McCREARY.
JOHN McCREARY.

Witnesses to both signatures:
J. SCHAEFFER.
W. M. LANMAN.

167 J. J. J. No. 8.

UNITED STATES PATENT OFFICE.

JOHN McCREARY, of Middletown, Pennsylvania, assignor of one-half of his right to ELIJAH McCREARY, of same place.

Improvement in Coupling and Steering Apparatus.

Specification forming part of Letters Patent No. 129,844, dated July 23, 1872.

Specification.

To all whom it may concern:

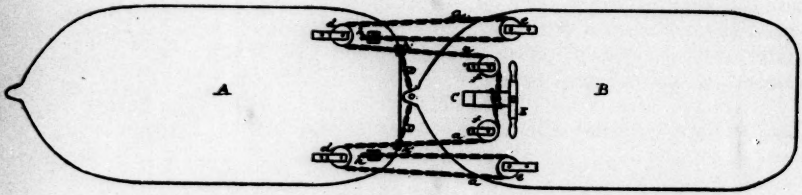
Be it known that I, John McCreary, of Middletown, in the county

J. McCREARY. 169

Improvement in Coupling and Steering Apparatus.

No. 129,844. Patented July 23, 1872.

Fig. 1.



No. 368
McCreary } p. 169.
Pa. Canal Co.

Fig. 2.

Witnesses.

Jos. L. Coombs
J. L. Coombs.

Inventor.

John McCreary.

of Dauphin and State of Pennsylvania, have invented a new and useful improvement in devices for coupling and steering canal-boats; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and the letters of reference marked thereon.

Specification describing certain improvements in steering devices for canal-boats, invented by John McCreary, of Middletown, in the county of Dauphin and State of Pennsylvania.

My invention relates to certain improvements in devices for steering canal-boats, &c., described in letters patent granted to Elijah McCreary and John McCreary April 16, 1872, No. 125,684, by means of which two boats are coupled together, and navigated and steered as one boat by means of a single steering-wheel. My improvements consist, first, in substituting for the projecting cut-water and notch described in said patent for centering the boats together and forming a universal joint a chain attached at both ends to one boat, and at its center to a central point on the adjacent end of the other boat, as shown in the annexed drawing; second, in attaching the ends of the coupling-chain to one of the boats by means of crow-foot claw-hooks, so as to render the chain easily adjustable, as hereinafter shown and described.

(Here follows diagram marked p. 169.)

In the accompanying drawing, Figure 1 is a top view of a pair of boats coupled and centered together, showing also the coupling, steering, and centering devices. Fig. 2 is a detached view of one of the claw-hooks, to which the ends of the coupling-chain are attached, on an enlarged scale.

A is the forward boat, and B the rear boat. These boats are coupled together by means of a chain or rope, *a*, the ends of which are fastened to the forward boat by means of the claw-hooks *h h* on said forward boat. The central portion of said chain or rope is wound around a horizontal windlass, C, on the rear boat, and it passes around pulleys or sheaves *d d* on the forward boat, and *e e* and *f f* on the rear boat. D is a chain, the ends of which are attached to the rear overhanging guard of the forward boat at points *h' h'*, and the central part of which is linked to the cut-water, or to a central point on the forward end of the rear boat, the said chain being so attached to the forward boat as to have a little slack.

It is essential that the chain D on the forward boat or the point of its attachment to the rear boat shall be on a projecting or overhanging guard or bumper (or both may be so placed), so that the connection will form a universal joint between the adjacent ends of the two boats and allow the boats to assume any angle in respect to each other, whether vertically or laterally, without coming in contact at any point except said point of connection.

E is the steering-wheel, shown in the drawing as placed upon the end of the windlass-shaft; but, in order to gain power, the said wheel may be mounted on a separate shaft, with a small pinion gearing with a larger cog-wheel on the windlass-shaft. By this gearing the power of the windlass may be increased or multiplied

to any desired degree. When a chain is used the windlass-shaft should be fluted or corrugated to prevent the chain from slipping.

Instead of a horizontal windlass the chain or rope may be made to pass around a vertical shaft or a chain-wheel, as shown in the said patent of Elijah and John McCreary of April 16, 1872.

The coupling and steering chain is attached to the forward boat by slipping one of its links edgewise between the claws of the crow-foot. It may thus be easily and quickly adjusted to any degree of tautness or slackness desired.

What I claim as my invention, and desire to secure by letters patent, is—

1. The combination of the two boats A and B, the coupling and steering chain *a* passing around pulleys *d d*, *e e*, and *f f*, and
168 around windlass C or its equivalent, and the chain D attached to an overhanging guard or bumper on one boat and to the adjacent end of the other boat, so as to form a universal joint between them and keep them centered, substantially as shown and described.

2. In combination with the subject-matter of the foregoing claim, I also claim the claw-hooks *h h* for attaching and adjusting the coupling and steering chain *a*, substantially as described.

JOHN McCREARY.

Witnesses:
J. J. COOMBS.
JAMES S. GRINNELL.

171 UNITED STATES PATENT OFFICE.

JOHN McCREARY, of Middletown, Pennsylvania.

Improvement in Coupling and Steering Apparatus.

Specification forming part of Letters Patent No. 129,844, dated July 23, 1872; reissue No. 5630, dated October 28, 1873; application filed October 11, 1873.

To all whom it may concern:

Be it known that I, John McCreary, of Middletown, in the county of Dauphin and State of Pennsylvania, have invented certain improvements in steering devices for canal-boats, of which the following is a specification:

My invention relates to certain improvements in devices for steering canal-boats, &c., described in letters patent granted to Elijah and John McCreary, April 16, 1872, No. 125,684, by means of which two boats are coupled together and navigated and steered as one boat by means of a single steering-wheel. The invention described in said letters patent consisted, principally, in coupling two boats together by means of a chain or rope passing around a steering-wheel on one boat, and around a system of sheaves or pulleys, and attached to the other boat, for the purpose of steering said boats as well as of coupling them; and in centering said boats together and forming a universal joint between them by means of an overhanging guard or bumper on the stern of the forward boat, with a central notch therein, into which the projecting stem or cut-water of the rear boat fitted.

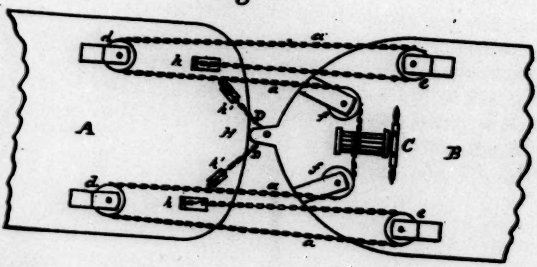
J. McCREARY. 170

Coupling and Steering Apparatus.

No. 5,630.

Reissued Oct. 28, 1873.

Fig. 1.



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Pa. Canal Co. } p. 170. – J. J. J. No. 9.

Fig. 2.

Witnesses
Jos. L. Coombs
J. M. Coombs

Inventor
John McCreary
By J. L. Coombs
Attorney.

My improvements consist, first, in coupling and centering said boats together and forming a universal joint between them by means of a chain, the two ends of which are fastened to opposite points on the stern of the forward boat, and the central part to the stem or cut-water, or some central point on the bow, of the rear boat, so as to hold its stem or cut-water against the overhanging guard or bumper of said forward boat, said chain serving to center the boats without the necessity of any notch in the overhanging guard for the stem of the rear boat to fit into, and at the same time coupling and holding the boats together and forming a universal joint between them; second, in attaching the ends of the coupling and steering chains to the boats by means of crow-foot claw-hooks, so as to render the chains easily adjustable, as hereinafter shown and described.

(Here follows diagram marked p. 170.)

In the accompanying drawing, Figure 1 is a top view of a pair of boats coupled and centered together, showing also the coupling, steering, and centering devices. Fig. 2 is a detached view of one of the claw-hooks, to which the ends of the coupling-chains are attached, on an enlarged scale.

A is the forward boat, and B the rear boat. These boats are coupled together by means of a chain or rope, *a*, the ends of which are fastened to the forward boat by means of the claw-hooks *h h* on said forward boat. The central portion of said chain or rope is wound around a horizontal windlass, C, on the rear boat, and it passes around pulleys or sheaves *d d* on the forward boat, and *e e* and *f f* on the rear boat; but as my improvements relate only to the means of coupling and centering the boats and forming a universal joint between them, and not to the steering mechanism described in said former patent, it is manifest that the number of sheaves or pulleys over which the steering-chain passes can have no effect upon the applicability of my said improvements. D is a chain, the ends of which are attached to the rear overhanging guard H of the forward boat at points *h' h'*, and the central part of which is linked to the stem, or to a central point on the bow, of the rear boat, the said chain being so attached to the forward boat as to have a little slack, but not enough to prevent the overhanging bumper and the stem or cut-water from remaining at all times substantially in contact.

It is essential that there shall be an overhanging guard or bumper on the rear end of the forward boat, to separate the adjacent ends of the hulls, in order to form a universal joint between them, and allow the two boats to assume an angle in respect to each other, whether vertically or laterally, without coming in contact at any point except the point of connection between the stem or cut-water of the one and the overhanging guard or bumper of the other.

E is the steering-wheel, shown in the drawing as placed upon the end of the windlass-shaft; but, in order to gain power, the said wheel may be mounted on a separate shaft, with a small pinion gearing with a larger cog-wheel on the windlass-shaft. By this gearing the power of the windlass may be increased or multiplied to any desired degree.

When a chain is used, the windlass-shaft should be fluted or corrugated to prevent the chain from slipping.

172 Instead of a horizontal windlass, the chain or rope may be made to pass around a vertical shaft or a chain-wheel, as shown in the said patent of Elijah and John McCreary, of April 16, 1872.

The coupling and steering chains are attached to the forward boat by slipping one of the links edgewise between the claws of the crow-foot. They may thus be easily and quickly adjusted to any degree of tautness or slackness desired.

What I claim as my invention, and desire to secure by letters patent, is—

1. The combination of the two boats A and B, the steering-chain *a*, passing around sheaves or pulleys, and around the windlass C, or its equivalent, the overhanging guard or bumper on the stern of the forward boat, and the chain D attached to opposite points on the stern of said boat and to the stem or central part of the bow of the rear boat, so as to form a universal joint between them, and keep them coupled and centered, substantially as shown and described.

2. In combination with the boats A and B and the coupling and steering mechanism herein described, the claw-hooks *h h*, for attaching and adjusting the coupling and steering chains, substantially as set forth.

JOHN McCREARY.

Witnesses:
J. J. COOMBS.
T. M. COOMBS.

174 UNITED STATES PATENT OFFICE.

ISAAC J. WISTAR, of Philadelphia, Pennsylvania.

Improvement in Coupling and Steering Train-Boats.

Specification forming part of Letters Patent No. 134,341, dated December 24, 1872.

To all whom it may concern:

Be it known that I, Isaac J. Wistar, of the city and county of Philadelphia, State of Pennsylvania, have invented certain improvements in steering canal-boats, of which the following is a specification:

My invention relates to the well-known mode of steering coupled canal-boats by changing their angles in respect to each other, an example of this mode being described in the English patent of W. H. Bartholomew, February 7, 1862. The objects of my invention are simple and effective appliances for coupling the boats together, and an efficient, economical, and easily-operated steering apparatus.

(Here follows diagram marked p. 173.)

I attain the first object by coupling-chains A A′, secured to the adjoining boats B B′, and crossing each other, as shown in the plan

I. J. WISTAR.

Coupling and Steering Train-Boats.

No. 134,341. Patented Dec. 24, 1872.

No. 386.
McCreary
v.
Pa. Canal Co.
p. 173.

J. J. J. No. 11.

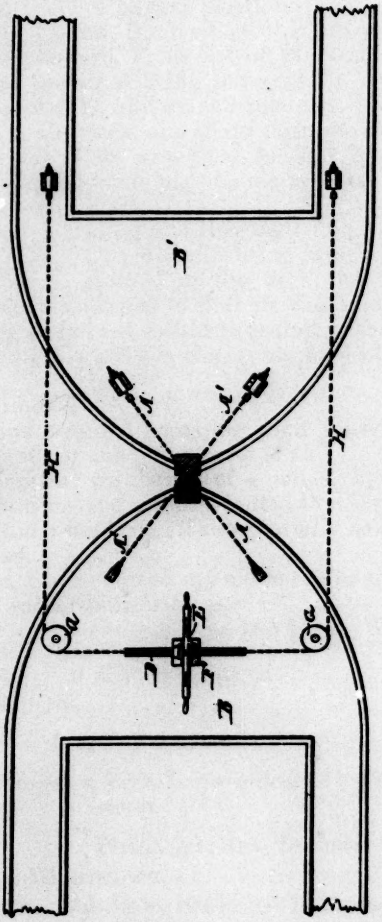


FIG. 1.

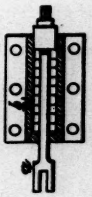


FIG. 2.

WITNESSES. Harry Smith
Thomas McIlvain

Isaac J. Wistar
by his Attys.
Howson and Son

view, figure 1 of the accompanying drawing, so that while the stern-post of one boat is maintained in contact with and in the proper lateral position in respect to the cut-water of the other boat, by the crossed chains, the latter will permit the boats to assume different angles in respect to each other. By crossing the chains as described the necessity of devices for taking up or letting out portions of the chains as the boats alter their respective positions is avoided. The second object I attain by a screw, D, of which the hub of a steering-wheel, E, mounted on a standard, F, on one of the boats B, is the nut, the opposite ends of the screw being connected to chains H H, which pass around sheaves G G, and extend thence to the boat B′, where they are secured to the deck, one chain near one side and the other near the opposite side of the said boat, so that by operating the steering-wheel the coupled boats may be made to assume different angles in respect to each other.

I prefer to connect both coupling and steering chains to the boats in the manner shown in Fig. 2, each chain being attached to a bolt, *a*, passing through a box, *b*, secured to the deck, the bolt being secured by a nut to a block arranged to slide in the said box, and bearing against a spring contained within the same, so that the bolts can yield to a limited extent when the chains are subjected to great strains.

I claim as my invention—

1. The coupling-chains A and A′, crossing each other and connected to the boats, as and for the purpose set forth.

2. The steering apparatus, consisting of a wheel, E, hung to a standard on one boat, and having a hub adapted to a screw, D, connected by chains H to the other boat, all substantially as and for the purpose herein described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAAC J. WISTAR.

Witnesses:
WM. A. STEEL.
HUBERT HOWSON.

175 J, J, J, No. 12.

Pennsylvania Canal Company, president's office, 234 South Third street.

PHILADELPHIA, *December* 13, 1871.

Messrs. McCreary & Co., Middletown.

DEAR SIR: Mr. Stickney thinks we could use 10 more double section boats from Wilkes Barre next season, and I would give you an order for them if they could be paid for in bonds or otherwise deferred till the latter part of next season, expenditure being till then so heavy for enlargement.

One other thing would be necessary, which I presume there would be no difficulty about, viz: Before we introduce a new kind of boat, with a probability that in case of its giving satisfaction we should want a large number of them, we should want to know on

what terms we could hereafter use your patent; how much per boat.

Of course, we would not introduce any boat not knowing what terms might hereafter be exacted for its use. It is probable we might never want to build any ourselves, but in case we did we would want to have a distinct understanding about the royalty before introducing the boat; otherwise we would have no con-
176 trol over the price. Whatever boat we finally decide on will be used in large numbers and exclusively, in order to preserve uniformity in freights and expenses. Within 4 or 5 years we shall, with the Juniata enlargement, have use for over 1,000 boats of 300 tons each.

Very respectfully, I. J. WISTAR.

J, J, J, No. 13.

Pennsylvania Canal Company, president's office, 233 South Fourth street.

PHILADELPHIA, *September* 26, 1872.

Messrs. E. & J. McCreary, Middletown, Penna.

DEAR SIRS: I am in receipt of your favor of 23d to Mr. Whitney, agreeing to sell to the canal company the right to couple fifty pair of boats with your patent coupling and steering arrangements for $50 for each pair of boats.

The company accepts your proposition and will pay you the sum named for each pair of boats in cash as fast as we apply the invention.

I think the price is so high as to set everybody trying to invent something similar, which will be likely to give you much trouble. If you placed the price lower there would probably be but little infringement and greatly increased use, in my opinion.

Please state whether you will extend the above agreement of $50 to all boats we may couple from now till the end of next season, as we have a lot of old boats that it might pay to couple. If you so extend it I will give you an answer in a short time.

Yours respectfully, I. J. WISTAR, *President.*

177 J, J, J, No. 14.

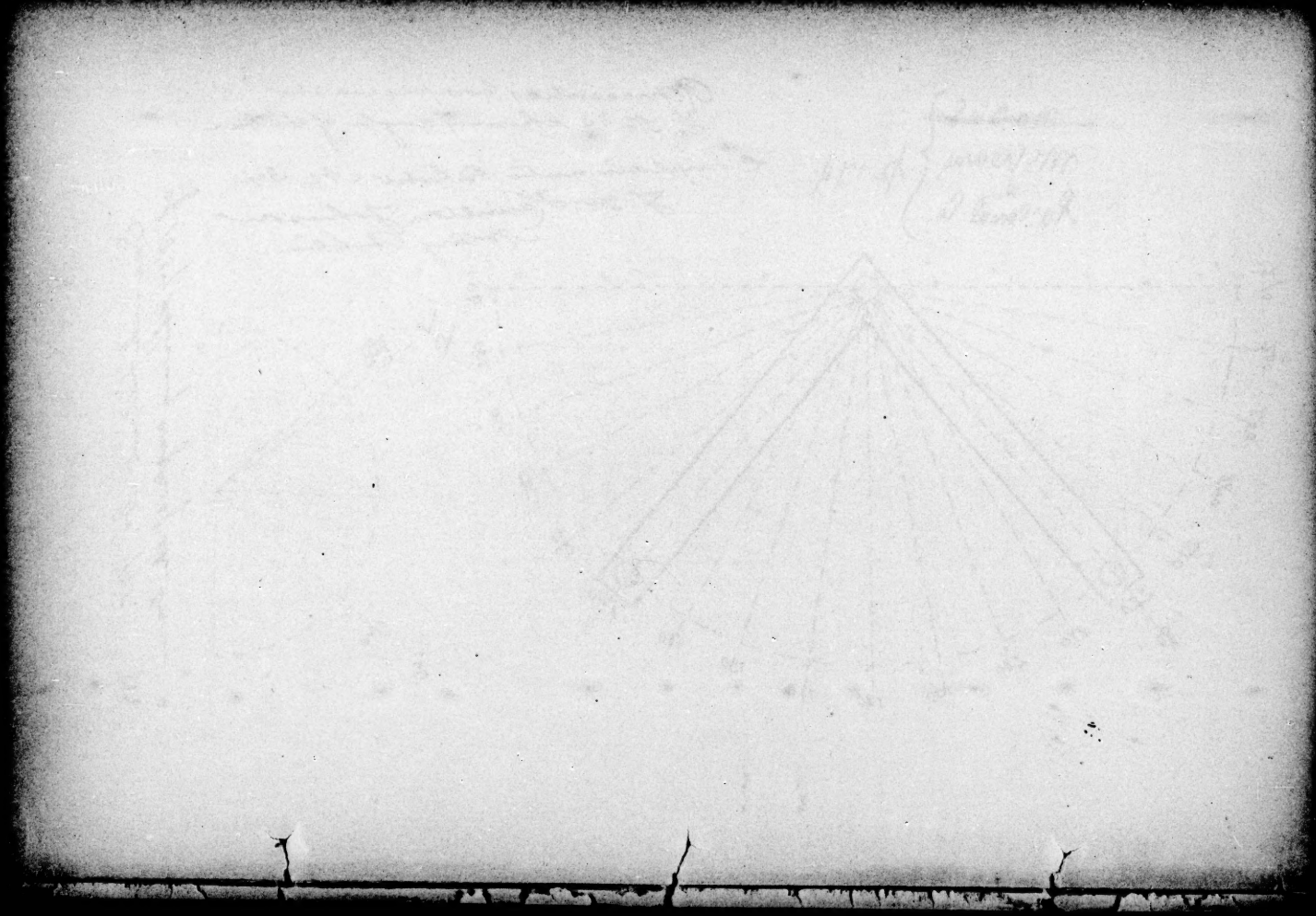
Pennsylvania Canal Company, president's office, 234 South Third street.

PHILADELPHIA, *October* 25, 1871.

Messrs. McCreary & Co., Middletown, Pa.

DEAR SIRS: I think your model of coupling connections is the best I have seen and cannot see why it could (not) be used to advantage from Wilkes Barre, even in the present condition of the canal.

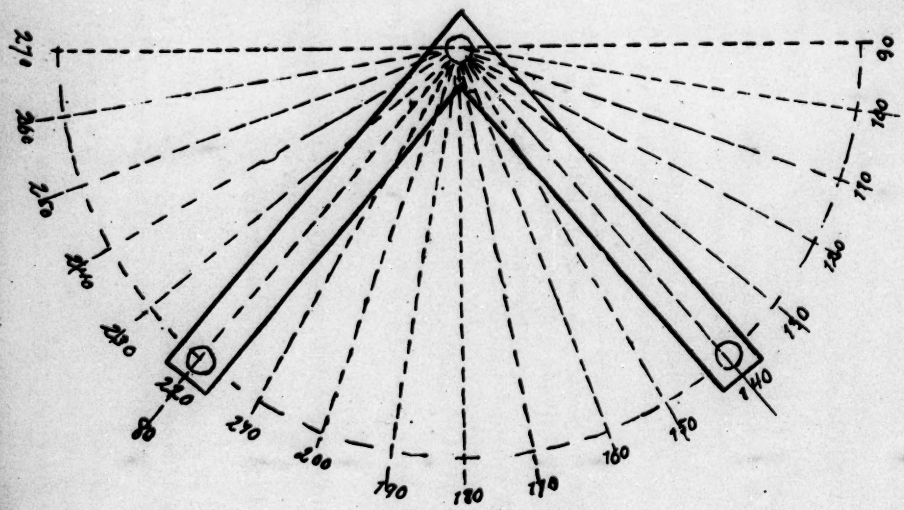
I would like to see you the next time you are in Philadelphia, and, in the meantime, would like to know whether you are yet building the trial boat proposed and whether the sections will have ca-

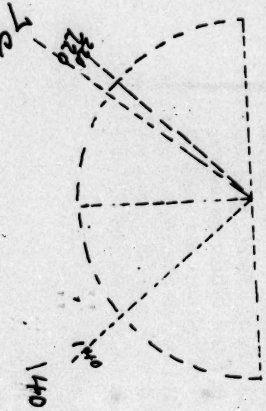


No. 368.
McCreary.
#
Pa. Canal Co.
} p. 179.

Representing Complainants
Ex. No 33 showing angle of the bar.

Complainants Exhibit No 34
J. W. Hamilton Johnson
Notary Public.





English patent No. 1795
of 1857 showing angle of the bar.

179

180

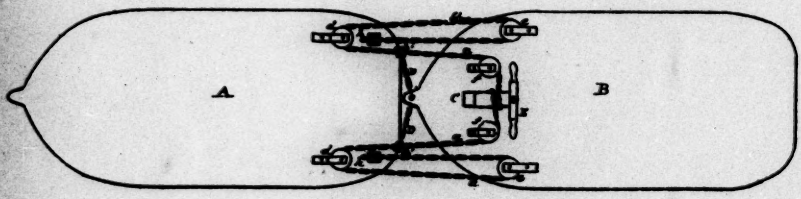
Complainants Exhibit No: 35
D. H. Hamilton Johnson
Notary Public

J. McCREARY.

Improvement in Coupling and Steering Apparatus.

No. 129,844. Patented July 23, 1872.

Fig. 1.



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McCreary } p. 180
Pa. Canal 6

Fig. 2.

Witnesses.
Jos. L. Coombs
J. J. Coombs.

Inventor:
John McCreary

McCreary
vs
Penna Canal
Co

C.C. U.S. E.D. of Pa
No 66 Octr Sess 1873
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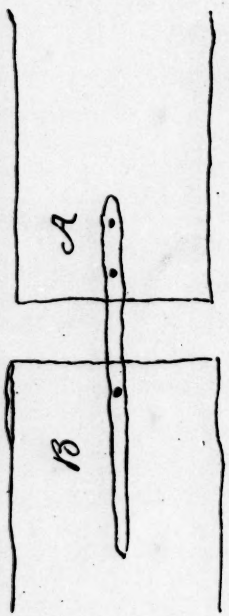
S.B
U.S. Comr



No. 368.
McCreary
vs
Pa Canal Co.

p. 181.

pacity and strength to load on six feet water, which depth we expect to have next spring from Wilkes Barre, and are therefore building our boats heavier than heretofore.

When will your double boat be finished? Have you material to build, say, five more, if desired?

Yours respectfully, I. J. WISTAR, *President.*

J, J, J, No. 15.

MIDDLETOWN, *Sept.* 28, 1872.

I. J. Wistar, Esq.

DEAR SIR: In reply to yours of September 26th we will sell your company the right of our invention to couple all the boats above fifty pairs you may wish to couple during the boating season of 1873, to be paid when applied at the same price of $50 for each pair of boats for their natural life. This rigging will last for ages and can be moved from boat to boat, where said boats are worn out or
178 abandoned and rigging moved to other boats. We will claim $50 in all such cases, and for the first fifty pair at $50 per pair, making $2,500. We will close it out with your company if paid cash in thirty days. (If) the above is satisfactory or accepted please let us know as early as possible.

Yours respectfully, E. & J. McCREARY.

(True copy. September 28th, 1872.)

(Here follow diagrams marked pp. 179, 180, & 181.)

182 JOHN MCCREARY *vs.* THE PENNSYLVANIA CANAL COMPANY. } No. 66. U. S. C. C., E. D. of Penna. October Session, 1873.

Depositions of witnesses taken before Samuel Bell, Esq., United States commissioner, on behalf of the defendants in above cause at the office of Theodore Cuyler, Esq., No. 704 Walnut street, at 4½ o'clock p. m., the 31st day of March, A. D. 1876, and on subsequent days by adjournment at the office (room No. 12) of the Pennsylvania Railroad Company, southeast corner of Fourth — and Willing's alley, in the city of Philadelphia, in said district, in accordance with the agreement of counsel.

4½ O'CLOCK P. M., FRIDAY, *March 31st*, 1876.
No. 704 Walnut street.

By agreement of counsel the taking of depositions on behalf of defendants is postponed until Tuesday, April 4th, 1876, at 11 o'clock a. m., at the office, room No. 12, Pennsylvania Railroad building, Fourth street and Willing's alley, Philadelphia, Pennsylvania.

PHILADELPHIA, *April 4th*, 1876.

Present: J. J. Coombs, Esq., representing the claimant, and A. B. Shearer and H. Baldwin, Jr., on behalf of the respondents.

THOMAS W. FRICK, a witness on behalf of defendants, being duly

sworn to tell the truth, the whole truth, and nothing but the truth, deposes and says in answer to interrogatories:

Question 1. What is your age, residence, and occupation?

183 Answer 1. I am aged twenty-nine years; I am a clerk in the Pennsylvania railroad office; residence, Chester, Pennsylvania.

Q. 2. State what acquaintance you have had with the construction and operation of canal-boats and where you first observed them.

A. 2. I first observed them in Lewisburg. I have been with my father all my life, and he has been building them ever since I was born. I lived at Lewisburg up to 1860, and then at Chester. He built canal-boats up to 1866.

Q. 3. How far had you, from 1860 to 1866, an opportunity of observing the ordinary construction of such canal-boats as were then in use generally?

A. 3. Well, I was in the yard at Chester, where my father was building, until 1865. I then went to school at Williamsport for one year, and after that went back to the yard again.

Q. 4. State whether you have seen, and, if yea, when, canal-boats constructed with overhangs, bumbers, or guards at the stern, substantially as represented in the model now shown you, J J J No. 16.

(Counsel for complainant objects to any proof by this witness of prior use or knowledge of the invention in controversy, for the reason that no foundation is laid for such testimony in the answer.)

A. 4. The first that I seen of this kind of a boat was at Chester, in 1862.

Q. 5. How many did you see there at that time?

A. 5. I couldn't say exactly. I think we built forty or fifty for the Delaware and Hudson Canal Company in the one contract.

Q. 6. Who built those boats?

A. 6. They were built by my father, William Frick; by the firm of Frick & Thomas.

Q. 7. Were those boats delivered to the company for which they were built?

A. 7. Yes, sir.

184 Q. 8. In 1862?

A. 8. I don't think they were all furnished in 1862, but between that and 1863.

Q. 9. How far back did the overhang or guard or bumper in those boats extend back beyond the line of the stern?

A. 9. Well, we usually put them on sixteen inches through them. The projection was fifteen inches beyond the stern post.

Q. 10. Did you work on these boats?

A. 10. I didn't do any labor on them. I was about the yard all the time.

Q. 11. How was the rudder attached or supported on these boats?

A. 11. Well, we put a shoe on at the bottom and passed the rud-

der post through the overhang, substantially as shown in the model No. 16.

Q. 12. How were the bows of these boats made?

A. 12. They were built with a solid stem. What I mean by that is the stem was all in one piece; the cut-water projected about nine inches at the middle; it curved back at the top and bottom with a sweep of two or two and a half inches.

Q. 13. Did the stem post project above the deck in these boats, or was there anything of that kind on them?

A. 13. There was a projection above the deck.

Q. 14. Substantially as in the boats No. 16?

A. 14. The cut-water projected up about as in boat No. 16, but there was no offset as in the model.

Q. 15. When and where did you first see canal-boats tapering at the bottom or undercut or rounded at the bow?

(Question objected to as immaterial.)

A. 15. I have seen the boats called the Mauch Chunk boats between 1862 and 1865. They tapered back from the top.

185 Cross-examined:

Cross-question 16. Were any of the boats of which you have been speaking coupled boats?

A. 16. None but the Mauch Chunk boats, called by boatmen the "Chunkers," because they came from Mauch Chunk.

Cross-Q. 17. How were these "Chunkers" coupled?

A. 17. They were cut like if one were to cut this model right in two. They were straight up and down in the middle where they came together, and had a cleat on the forward boat and a cleat on the after boat on each side of the deck, with ropes belayed from one cleat to the other and tightened up with a stick, tourniquet fashion; then there were also hinges on each side, about the middle of the ends of the sections.

Cross-Q. 18. When these two sections were thus united together they constituted a single boat, did they not?

A. 18. Yes, sir—that is, they were called what was a single boat.

Cross-Q. 19. Was there a flexible joint between these two sections, or was it rigid between these two sections?

A. 19. It was flexible vertically, but not laterally.

Cross-Q. 20. Then in turning a curve these two sections would keep in line with each other?

A. 20. Yes, sir.

Cross-Q. 21. Do you know the object in making these boats in sections.

A. 21. As far as I understand, it was for putting them on cars, to be hauled across inclined planes.

Redirect:

Q. 22. How were the bows and sterns of these "Chunkers" boats as to cut-water projecting from the bows and overhang at the stern?

A. 22. The cut-water projected from the outside of the hood
186 ends about six inches, and it was raked in from the top to the bottom of about six or eight inches. The stern was square across down to a certain point, with a bumper attached to the top part of it, on a level with the deck, projecting about a foot.

Q. 23. By the hood end do you mean the bow?

A. 23. Yes; I mean the forward end of the boat.

Q. 24. How was the rudder supported in these "Chunkers?"

A. 24. By dead wood bolted to the bottom of the boat with a shoe attached to it to support the lower end of the rudder, the upper end of which passed through the bumper like the model No. 16.

Recross examined:

Cross-question 25. You don't mean to say, do you, that there was any cut-water and overhang on the two ends of the sections that came together?

A. 25. No, sir.

(Signed) THOS. W. FRICK.

Sworn and subscribed before me this 4th day of April, A. D. 1876.

(Signed) SAMUEL BELL,
U. S. Commissioner.

JOHN BLANKENHORN, being duly sworn, according to law, to tell the truth, the whole truth, and nothing but the truth, deposes and says in answer to interrogatories:

Q. 26. What is your name, age, residence, and occupation?

A. 26. John Blankenhorn; I am thirty-eight years of age; residence, Harrisburg; occupation, carpenter.

Q. 27. Are you running a pair of boats on the line of the Pennsylvania canal?

A. 27. Yes, sir; I run two pairs.

187 Q. 28. How long have you run those two pairs or either of them?

A. 28. For the last two seasons.

Q. 29. They are coupled boats, are they not?

A. 29. Yes, sir.

Q. 30. Is either pair of those boats coupled as shown in the model J J J No 10?

A. 30. One pair is just like that exhibit in regards to the principle.

Q. 37. Point out any difference between the Exhibit No. 10 and boat you refer to.

A. 37. That is a more substantial—I mean the boats I run are more substantial; the principle is all the same. The rubber spring is more substantial on the boat than on the model. That is the only difference.

Q. 38. How is the other pair of boats coupled?

A. 38. On the principle of this model.

(Defendant's Exhibit No. 17, the said model, is put in evidence and marked Defendant's Exhibit No. 17.)

Q. 39. Is there any difference that you can point out between the model, Exhibit No. 17, and the pair of boats you refer to as made on that principle?

A. 39. As near as I can tell, just like this.

Q. 40 How long have you been running this pair of boats?

A. 40. The last two seasons.

Q. 41. Do you know of any other coupled boats run on the line of the Pennsylvania Canal Company like the Exhibit No. 17; and, if yea, to whom do they belong?

(Counsel for complainants objected to any proof by this witness of prior use or knowledge of the invention in controversy, on the ground that there is no foundation laid for such testimony in the answer.)

(Defendant's counsel, in reply to the objection, state that the witness is not called to prove any prior knowledge or use, as appears from the fact that he has only been running his boats for the past two seasons.)

188 A. 41. There are about four pairs. I understood three pairs belong to the Reading Railroad Co. and the other to some one I don't know.

Q. 42. Are those four pairs the only boats like Exhibit 17 that you know of on this line?

A. 42. That is all I know of.

Q. 43. Is the forward boat of each of those four pairs notched in the stern like Exhibit 17, forward boat?

A. 43. As near as I can tell positively; I wouldn't guarantee that part. As far as I can tell, none of them were without the notch.

Q. 44. On these four pairs of boats like Exhibit 17, is there any coupling between the two boats of each pair except the steering chain?

A. 44. No, sir.

Q. 45. When these boats are running, loaded, are the stern and stem kept in actual contact?

A. 45. Not at all times, for when you pull on the bow boat the slack of chain will give play.

Q. 46. When these boats are running without load are the stem and stern kept in actual contact; and, if yea, how and why?

A. 46. Those chains in running light should be tight to stiffen both boats. The same as steering one, they steer those boats by the tiller, when light.

Q. 47. By running when light, you mean without a load?

A. 47. Yes, sir.

Q. 48. In running light, then, the steering and coupling chain is not used for steering, but the rudder alone, as I understand you; is that correct?

A. 48. The chain is only used in case, probably, when another boat comes in contact with you, you want to turn out short.

Q. 49. Do any of these boats like Exhibit No. 17, that you know of, belong to the Pennsylvania Canal Company?

A. 49. Only the pair that I am running.

189 Q. 50. Do you know where the company got that pair of boats?

A. 50. Counsel for complainant states that the fact is, as to these boats, they were built by the Pennsylvania Canal Company, but the steering rig was furnished to them by Mr. McCreary.

Cross-examined:

Cross-question 41. The boats you are running, coupled like Exhibit No. 17, consist of a stern boat and barge, do they not?

A. 51. Yes, sir.

Cross-Q. 52. When you say that in the boats coupled like Exhibit No. 17 the cut-water of the rear boat and the stern of the forward boat are not always in contact, do you mean to say that they are so far separated that the cut-water will come clear out of the notch in the forward boat?

A. 52. That is owing to the slack of the chain. I, for my part, have never seen them slack enough for the cut-water to come out of the notch.

Re-examined:

Q. 53. In this pair of boats you are running, coupled like Exhibit No. 17, which is the steamer, the front or rear boat?

A. 53. The stern boat.

JOHN BLANKENHORN.

Sworn and subscribed before me this 4th day of April, A. D. 1876.

(Signed) SAMUEL BELL,
U. S. Commissioner.

It is stipulated and agreed between the counsel for the respective parties that the model, Defendant's Exhibit No. 17, is a substantially correct representative of the model pertaining to the

190 patent No. 125,684, to Elijah and John McCreary, dated April 16th, 1872, a copy of which patent is "Exhibit J J J No. 7" in this case.

Adjourned until Wednesday, the 5th of April, A. D. 1876, at 11 a. m.

Third Meeting.

PHILADELPHIA, *April 5th*, 1876.

Present: Mr. Coombs, on behalf of complainants; Mr. Baldwin representing the defendants.

JOHN TILL, a witness on behalf of the defendants, being duly sworn to tell the truth, the whole truth, and nothing but the truth, deposes and says:

Q. 1. What is your name, age, residence, and occupation?

A. 1. My name is John Till; I reside at Harrisburg, Pa.; I am seventy-one years of age; no occupation at present; was formerly a boat-builder.

Q. 2. How long and where were you engaged in boat-building, and what kind of boats did you build?

A. 2. I was engaged in boat-building the first time in 1835, in Harrisburg. I continued in that business, together with saw-mill, until the winter of 1856 and 1857. We built such boats as they used on the Schuylkill canal and Delaware and Hudson and Pennsylvania canals.

Q. 3. Look at the models, Exhibits J J J No. 10 and J J J No. 16, and state when you first knew of the construction and use of canal-boats with projecting cut-waters, or sterns, substantially as represented in these models.

A. 3. I never saw one without them; they varied sometimes in shape.

Q. 4. When and where did you first know of canal-boats with overhanging sterns, substantially as shown in the model, Exhibits J J J No. 16?

A. 4. I couldn't tell you exactly; I think the first I ever
191 saw was at Espy, Pa., in 1857, 1858, or 1859. I was boating at that time; that is, I mean in this form, with the chocks underneath, as in the exhibit.

Q. 5. When did you first know of a projection or overhang at the stern of canal-boats?

A. 5. The first projection that I know of was one I put on myself; that was a boat I built for Richard Hogan, formerly of Middletown; that was previous to 1840; and from that time to this they have spread all over the canals. We never built a square-stern boat since without the projection—a projection from 9, 10½, to 11 inches—so that a seven-inch rudder would cut right through them.

Q. 6. When did you see boats coupled together first, and how were they coupled?

A. 6. The first that ever I saw were two ark boats. They came down, I think, through the Union canal; that was, I think, between 1840 and 1845; they were coupled by being fastened together with a raft oar being fastened down upon one boat at two points upon the second boat. There was a wooden or iron pin that projected through the hole in the raft oar. The steersman stood upon the front boat and turned the hind boat around, and by turning this boat to the angle it naturally steered the other. Some time after I rigged two flats for Robert Tunis, of Harrisburg, upon the same plan.

Q. 7. In these boats you have mentioned, where was this pin on which the oar turned?

A. 7. The pin was on the stern of the first boat; it stuck six or seven inches from the deck; the oar turned on it.

Q. 8. How do they hold together two or more canal-boats when they are drawn by one team; I mean when there is no steering apparatus?

A. 8. It is not often done; sometimes they do it between locks; they hitch them together; they tie them together the handiest way.

Q. 9. Mention, please, one or two of the well-known ways of hitching together prior to 1856.

192 A. 9. As to the ways, I don't know anything particular; it is not a regular thing.

Q. 10. In building canal-boats, did you put cleats on them?

A. 10. Sometimes; of late days we are got to putting them on altogether.

Q. 11. What time do you refer to "of late days;" since when?

A. 11. I think cleats were put on as early as 1840; something I mean by late days up to 1856.

Q. 12. In these late days, how many cleats did you usually put in boats, and where did you put them?

A. 12. I knew as high as six to have been put in, one on each end, and two upon each side of the boat, certain distances from each end.

Q. 13. What was the object and use of these cleats at the ends of the boats?

A. 13. For to hitch lines to; for instance, to make fast to steamboats for towing.

Cross-examined:

Cross-question 14. Look at the sketch now shown you and state whether that represents the coupled boats, the first you ever saw, as coupled by a raft oar.

A. 14. Yes, that represents it; the oar is made fast on the boat A by two pins, and turns on a pivot on the boat marked "B;" the steersman stands on the boat B, at the far end of the oar.

(Complainant offer- in evidence the sketch shown to witness, marked Complainant's Exhibit V.)

Cross-Q. 15. You say you have seen canal-boats one turning the other many years ago between the locks; how near together were these boats coupled together when they were hitched together?

A. 15. I have seen — at all distances; sometimes half the length of the tow line apart, and sometimes close up together.

Cross-Q. 16. In such cases was there any steering rig by which a man on one boat could steer both boats?

193 A. 16. The only way that was done was the man in the front boat would steer and the other would naturally follow, except the wind would blow too strong.

Cross-Q. 17. When these boats were coupled close together, so that the bow of the rear boat would come in contact with the stern of the forward boat, how could a man in the forward boat steer them?

A. 17. Because the rear boat would likely be hitched right here (pointing to the rear of the side of the forward boat); if she was directly in the rear she wouldn't steer, the rudder wouldn't act—not if they were close together.

(Signed) JOHN TILL.

Sworn and subscribed before me this 5th day of April, A. D. 1876.
(Signed) SAMUEL BELL,
U. S. Commissioner.

CHRISTIAN HEICKEL, sworn on behalf of the defendants, being sworn to tell the truth, the whole truth, and nothing but the truth, deposes and says:

Q. 1. What is your name, age, residence, and occupation?
A. 1. Christian Heickel; I am fifty-six years of age; residence, Harrisburg; I am a dealer in lumber.
Q. 2. Have you been familiar with the operation of running of canal-boats; and, if yea, during what time?
A. 2. From 1838 up to 1853 I have boated myself; after 1853 I kept a store on the canal up to 1869.
Q. 3. How were canal-boats towed during this time?
A. 3. They ran single boats during my time; they were towed by mules and horses.
Q. 4. How were the tow-lines secured to these boats?
A. 4. Sometimes by cleats, sometimes by a hook on the sides.
Q. 5. How many cleats were there usually on canal-boats?
A. 5. Generally four; from four to six. Some boats had six on.
194 Q. 6. Please state where the cleats were located on the boats.
A. 6. One on the stern, one on the bow, and some boats had one each side ten feet from the stern, and some also had one on each side ten (10) feet from the bow—ten or fifteen feet.
Q. 7. What was the cleat at the stern used for?
A. 7. For a great many purposes—for tying up, for hooking on to another boat behind her.
Q. 8. Was the cleat at the stern crosswise or lengthwise of the boat?
A. 8. I think crosswise.
Q. 9. How long was it?
A. 9. I suppose from eighteen inches to two feet.
Q. 10. What was the width of deck at stern?
A. 10. She was a little tapering. I suppose about thirteen feet.
Q. 11. When this cleat was used for hooking on to another boat behind the one with the cleat on the stern, how was this hooking on effected?
A. 11. The line run out with a loop and dropped right over the stern post of the hind boat.
Q. 12. Where were the ends of the line?
A. 12. One end on each boat.
Q. 13. And belayed to the cleats?
A. 13. Yes, sir.
Q. 14. Was it usual to hook on in this way?
A. 14. No, sir; it was seldom done, except in an emergency, for a couple of miles or half a mile, to help along a man with a disabled team. I've seen boats towed with steamers on the Pennsylvania

canal. In those cases the forward boat was a steamer; the line ran back from the stern with a loop in the line running right over the stern post of the rear boat.

Q. 15. During what time was this towing?

A. 15. I can't tell exactly. It was during the time I was keeping store there prior to 1869—in 1865, 1866, or 1867.

195 Q. 16. Was it common or continuously done at that time?

A. 16. I saw a couple of other boats running the same way. One was the Black Hawk; one was the New Era. They were run that way for several seasons.

Q. 17. Did the steamer have an overhang or guard or bumper at the stern?

A. 17. I think she had a guard on her. Most of the boats built for the last thirty years had guards built on them.

Q. 18. Did the rear boat have a cut-water?

A. 18. Yes, sir.

Cross-examined:

Cross-question 19. In the case of these boats that were towed by steamers were the steamer and canal-boats coupled close together?

A. 19. No, sir.

Cross-Q. 20. What distance were they apart generally?

A. 20. They were from seventy-five to one hundred feet apart.

Cross-Q. 21. It is necessary, is it not, that the canal-boat or barge shall be a considerable distance from the steamer to keep it from the swell of the waves created by the steamer?

A. 21. I do not know that it is necessary, but it is customary. I suppose it is better to keep them forty or fifty feet away.

Cross-Q. 22. In these cases that you are speaking of was there any steering rig by which both boats were steered from one boat?

A. 22. No, sir.

(Signed) CHRISTIAN HEICKEL.

Sworn and subscribed before me this 5th day of April, A. D. 1876.

(Signed) SAMUEL BELL,
U. S. Commissioner, Special Examiner.

196 Defendant's counsel puts in evidence a model which complainant's counsel admits as a representation of the boat mentioned in the testimony of John McCreary in this case, designated as the "Sixteenth Amendment," but it is understood that in the boat "Sixteenth Amendment," as built and operated, the steering wheels were on the boat having the concave end instead of on the boat having the convex end, as in the model.

Also, there was a chain wheel where the cylindrical post is shown in the model in front of the steering wheel, which chain wheel was substituted for the post after the first trip.

The pivoted rod shown in the model, extending from one boat to the other, was not on the boat "Sixteenth Amendment."

The sheaves or pulleys in the "Sixteenth Amendment" were arranged differently from those shown in the model, as will be seen by Complainant's Exhibits J J J No. 6. It is further admitted that

this model was built by E. & J. McCreary before the boat "Sixteenth Amendment." The said model is put in evidence and marked "Defendant's Exhibit No. 18."

A. J. WHITNEY, a witness on behalf of defendants, being sworn to tell the truth, the whole truth, and nothing but the truth, deposes and says in answer to interrogatories:

Q. 1. What is your name, age, residence, and occupation?

A. 1. Andrew J. Whitney; I am forty-six years of age; I reside at Harrisburg, Pa., and am the resident engineer of the Pennsylvania Canal Company.

Q. 2. State what you know generally of the introduction in the Pennsylvania canal of coupled boats.

A. 2. The first pair of coupled boats were put on the canal in 1860 or 1861 by McCrearys, of Middletown. The boat was called the Experiment. The second pair of section boats were put on by Mr. William Frick, of Middletown, in 1867, I think, and the third pair was the William P. Jenks, also put on by Mr. Frick in 1868,
197 and the fourth pair was "Etter Suple and Carmany," put on by Mr. Frick, and the next was the "Sixteenth Amendment." In the next were the Hall boats, built by McCreary Brothers for Hall Brothers, of Baltimore. The next were put on by the Pennsylvania Canal Company.

Q. 3. Look at the model, Defendant's Exhibit No. 17, and state how far that represents the Hall boats and any other McCreary boats that have been put on your line.

A. 3. This model represents the four "Hall boats" and the Pennsylvania Canal Company boats No. 136 and No. 137, put on by permission of Mr. McCreary and now run by John Blankenhorn.

Q. 4. Are there any other McCreary boats on your line except these you have mentioned—coupled boats?

A. 4. None are on our line.

Q. 5. Are all of the "Hall boats" provided with a notch in the stern of the forward boat?

A. 5. Yes, sir; they are all built in that way.

Q. 6. Are all of the "Hall boats" connected by the steering chain as shown in "Exhibit 17" without any other coupling?

A. 6. They are.

Q. 7. Do you know of any other McCreary coupled boats?

A. 7. No, sir.

Q. 8. Have you ever seen a pair of boats of McCreary's build coupled, as represented in the model J J J No. 16?

A. 8. I have never seen any boats according to this model J J J No. 16.

Q. 9. Please look at the model now shown you and state how far you find represented therein the coupling and steering rig used on the coupled boats used by the Pennsylvania Canal Company other than the two boats (Blankenhorn) No. 136 and No. 137.

A. 9. This represents the company's boats.

Said model put in evidence and marked (Defendant's Exhibit No. 19).

Q. 10. Please state how many sheaves you find in Defend-
198 ant's Exhibit No. 17, how many on J J J No. 16, and how many on Defendant's Exhibit No. 19.

A. 10. There are six on No. 16 and two on No. 19, four on No. 17.

Q. 11. Do you understand what function is performed by the chain wheel on Defendant's Exhibit No. 17?

A. 11. It is used for applying the power for steering the boats.

Q. 12. What function is performed by the coupling chain in the Defendant's Exhibit No. 19?

A. 12. It is used to hold the boats together and to hold them in place laterally.

Q. 14. In the operation of the boats like Defendant's Exhibit No. 19, does the bow of the rear boat remain in contact with the stern of the forward boat?

A. 14. Not always.

Q. 15. What is a universal joint?

A. 15. It is a joint that can be moved in any direction to throw a shaft out of line.

Q. 16. Does the contact of the cut-water of the rear boat with the overhanging stern of the forward boat in Defendant's Exhibit No. 19 make a universal joint?

A. 16. It does, so far as the motion of the boat is concerned.

Q. 17. How far is the motion of the boat affected by the fact that there is at times in contact between the two boats?

A. 17. That depends upon how closely they are coupled; they move laterally from one to two feet in ordinary use.

Q. 18. How much slack must a coupling chain have to admit of this range of lateral movement?

A. 18. I should think six inches.

Q. 19. Then if the coupling chain is slack enough to admit of this ordinary range of lateral movement what brings the boats in contact when they so touch?

A. 19. The suction of the forward boat draws the rear boat up to its place, and the gum or coil spring used in the coupling takes up the slack and brings the boats in contact.

199 Q. 20. If the slack was not taken up there would be nothing but the suction to bring them in contact?

A. 20. Nothing but the suction and the steering chain.

Q. 21. Then in the defendant's boat like Exhibit No. 19 the contact between the two boats is dependent, not upon the coupling chain, but upon the steering chain and the springs?

A. 21. That is it.

Q. 22. If the coupling chains were attached to claw-hooks direct without any spring, as in the model "J J J" No. 16, how far would the coupling chain act to maintain the bow and the stern of the boat in actual contact?

A. 22. It couldn't be done; they couldn't be kept in contact at all times.

Q. 23. How far would a system of sheaves-gearing and windlass with a steering chain arranged as shown in the model "J J J" 16

multiply the power of the steersman as compared with the system of sheaves, windlass chain, wheel, and chain shown in Defendant's Exhibit No. 17?

A. 23. I can't give the exact proportion of powers, because I don't know the relative size of the wheels; by increasing the number of pulleys the power is applied direct to the pulleys, the hand power which is made use of for steering, which avoids the use of gearing.

Q. 24. Have you ever estimated the cost or do you know the cost of the coupling and steering mechanism represented in Defendant's Exhibit No. 17, including its application to the boat?

(Objected to as immaterial.)

A. 24. I do not know cost; I couldn't give the figures. I have made no estimate.

Q. 25. Do you know when the Pennsylvania Canal Company first coupled a pair of boats as shown in the model Exhibit No. 19?

A. 25. In the spring of 1873.

Q. 26. Had the company at that time any boats which did not have an overhang or guard or bumper at the stern?

200 A. 26. They had some boats built with what we call a counter-stern. The stern of the boat was built with a slope and had a bumper to protect the rudder.

Q. 27. Was the same the fact in 1872?

A. 27. It was.

Q. 28. Had you any knowledge of any experiments towards this arrangement of coupling and steering mechanism, shown in Exhibit No. 19, before 1873?

A. 28. I had not.

Q. 29. Prior to 1873 did the Pennsylvania Canal Company make any experiments to ascertain the relative power acquired to tow coupled boats compared with towing two boats separately?

A. 29. I made experiments either in 1871 or 1872, I don't recollect which.

Q. 30. What did you ascertain?

A. 30. The result of my experiments showed that it required 50 per cent. more power to tow two (2) boats than a single boat, the two (2) boats having double the tonnage of a single boat.

Cross-examined:

Cross-question 31. Are you a practical canal-boat navigator?

A. 31. No, sir; I am not.

Cross-Q. 32. Who owns the boats on the Pennsylvania canal coupled like Exhibit No. 19?

A. 32. The Pennsylvania Canal Company.

Cross-Q. 33. In the boats coupled like Defendant's Exhibit No. 19, I understand you to say that the gum springs take up the slack of the chains, except when they are compressed?

A. 33. Yes, sir.

Cross-Q. 34. In your answer to your direct interrogatory No. 32 you expressed the opinion that if the coupling chain were attached to claw-hooks direct without any spring, as in the model J J J No.

16, the stern of the forward boat and the cut-water of the rear
201 boat could not be kept in contact at all times. By this I suppose you mean that you could not draw the coupling chains so taut but that the boats would spring slightly apart under certain circumstances?

A. 34. My opinion is that they would spring apart several inches if coupled in the way as shown in the models.

Cross-Q. 35. If the coupling chain were drawn as taut as it conveniently could be, would not the boats under ordinary circumstances, in running, be kept practically in contact?

A. 35. I think not. I don't think it practicable to keep those boats together in that way.

Cross-Q. 36. Do you know the facts that Messrs. McCrearys altered the boats "Tide-Water," "Etter, Suple, and Carmany" by putting their coupling and steering rig upon them?

A. 36. Yes; I think both of them.

Cross-Q. 37. Do you recollect the fact that those boats when altered were coupled by a coupling chain like that shown in Exhibit J J J No. 16, which chain was attached to claw-hooks without springs?

A. 37. I never observed it.

Cross-Q. 38. Are you aware that Thomas T. Wireman ordered the McCrearys to build two (2) test boats for the Pennsylvania Canal Co., by request of General Wister, at a set price, and to put their coupling and steering rig on the same, and the order was revoked after the McCrearys had furnished the lumber.

A. 38. I recollect something about it, but I don't recollect the particulars.

Cross-Q. 39. Is not one of the functions of the coupling chains as shown in Defendant's Exhibit No. 19, and also in Complainant's Exhibit J J J No. 16, to hold the boats centred, or nearly so?

A. 39. Yes; it is; to hold them in place laterally or centrally.

Cross-Q. 40. Will not the coupling chain as shown in
202 Exhibit J J J No. 16 and in Defendant's Exhibit No. 19 both perform that function?

A. 40. That is a question of judgment. In my opinion, it would not be practicable to couple boats as shown in model No. 16 and operate them on the canals.

Cross-Q. 41. State your reasons why.

A. 41. The chain if tightened up would be broken by boats cramping in the locks or running onto the banks or slopes of the canal.

Cross-Q. 42. Would not that danger be obviated by giving the coupling chain a little slack?

A. 42. It would be necessary to give it so much slack that the boats could not be kept in line.

Cross-Q. 43. This is a mere matter of opinion on your part, is it not?

A. 43. It is an opinion deduced from observation.

Cross-Q. 44. When did you ever observe a pair of boats coupled as in Exhibit J J J No. 16?

A. 44. I never saw a pair of boats coupled in that way. I mean from observation—the operation of boats in the canal.

Cross-Q. 45. Do you regard yourself as an expert in canal-boat navigation?

A. 45. I have observed the operation of boats in the canal closely for the last seventeen years and been along with the coupled boats in making several trips for the purpose of making observations.

Cross-Q. 46. If the coupling chain and hooks were made strong enough, it would be very difficult to break them, would it not?

A. 46. I think it would be difficult to make them strong enough without giving additional strength to the part of the boat to which they were attached.

Cross-Q. 47. In a pair of boats rigged like Exhibit J J J No. 16 would not the steering chain hold the bolts nearly in contact and prevent the breaking of the coupling chain if the coupling chain were a little slack?

203 A. 47. I don't think it would be any support to the coupling chain.

Cross-Q. 48. Suppose the coupling chain were a little more slack than the steering chain, how could there be any strain upon the coupling chain?

A. 48. There would not be any ordinarily, and, as I explained before, the boats could not be kept in line.

Cross-Q. 49. Referring now to Defendant's Exhibit No. 17, what holds the boats in contact, or nearly in contact?

A. 49. The steering chain ordinarily, but they sometimes get out of place.

Cross-Q. 48. Suppose boats rigged like Defendant's Exhibit No. 17 had a coupling chain like Exhibit J J J No. 16, which chain was as slack as the steering chain, would it be liable to break?

A. 48. I think it would not.

Cross-Q. 49. You say that in a boat rigged like Defendant's Exhibit No. 19 the gum springs are sometimes so compressed as to allow the boats to separate four or five inches. Does the separation of the boats to that extent prevent them from keeping practically in line sufficiently so for practical purposes?

A. 49. The boats become detached when they cramp in locks or one of them runs onto the slope of the banks and when they collide with other boats, but when there is nothing to interfere with them the gum springs draw them back in line again.

Cross-Q. 50. If there were no gum springs and the coupling chain had slack enough to allow the boats to separate four or five inches on such occasions, would there be any danger of the coupling chain breaking?

A. 50. There would not if it had sufficient slack.

Cross-Q. 51. Would that amount of slack prevent the boats from keeping in line for practical purposes?

A. 51. It would.

Cross-Q. 52. Then why do not the company's boats having

204 springs that allow boats to separate four or five inches get out of line when they so separate?

A. 52. Because the gum springs draw them back in place again.

Cross-Q. 53. Do you think it is necessary that the coupling chain be so slack as to allow the boats to separate four or five inches?

A. 53. I think it is important.

Cross-Q. 54. Do you know how deep the notch in the overhang of the Hall boats is?

A. 54. I do not from measurement, but somewhere from four to six inches.

Redirect:

Q. 55. Who use or operate the coupled boats like Exhibit No. 19, owned by the Pennsylvania Canal Company?

A. 55. They are leased to boatmen, who pay a percentage of the freight for the use of the boats.

Q. 56. It is a fact that in boats coupled like Exhibit No 19 the boats can assume any angle with respect to each other, whether vertically or laterally, without coming in contact except at the point of connection?

A. 56. It is; any angle that is necessary for boats to assume in navigating a canal.

Q. 57. Is the same true of the boats coupled like boats Exhibit No. 17.?

A. 57. It is.

Q. 58. Are you familiar with the operation of these coupled boats like Exhibit 19 during the whole time they have been used by the company, and is such familiarity a part of your duty as resident engineer of the company?

A. 58. I have observed them carefully, but it is not my duty especially as resident engineer.

Q. 59. If the coupling chain in Exhibit 16 was tightened up so as to hold the boats firmly together, would there be any longer a universal joint between them?

A. 59. There would not.

205 Q. 60. If slack enough were given the steering chain to tighten up the coupling chain to this extent, would the boats steer by the steering chain?

A. 60. It would not be practicable to steer the boats with so much slack in the steering chain.

Q. 61. When the two pair of boats were altered (mentioned in question 36) by Messrs. McCreary which steering chains were put upon them?

A. 61. Those in Exhibit No. 17.

Q. 62. Did they notch the stern of the forward boat in making that alteration?

A. 62. I don't know whether they did or not; I don't remember. I only know that Mr. Frick's apparatus was taken off and Mr. McCreary's put on, but whether this was in whole or in part I do not know.

Q. 63. In the model, Exhibit No. 19, defendant's boat, what is the point from which the steering powers acts upon the forward boat?

A. 63. Where the steering chain is attached to the boat.

Q. 64. In the model, Exhibit No. 16, where does the steering power act upon the forward boat?

A. 64. Where the chain is attached to the boat the power is distributed through the pulleys and is transmitted to the point of attachment of the chain.

Q. 65. Then it acts immediately upon the pulleys on the forward boat and ultimately upon the point of attachment?

A. 65. Yes, sir.

(Signed) A. WHITNEY.

Sworn and subscribed before me this 4th day of April, A. D. 1876.

(Signed) SAMUEL BELL,
U. S. Commissioner, Special Examiner.

Adjourned until 11 a. m., 6th day April, A. D. 1876.

206 *Sixth Meeting.*

APRIL, 1876.

Present: Mr. Baldwin and Mr. Coombs.

A. J. WHITNEY recalled for further cross-examination:

Cross-question 66. I think you stated in your direct examination that the company's boats were so coupled that they would separate longitudinally, under certain circumstances, five or six inches.

A. 66. I think I said four or five inches.

Cross-Q. 67. What is your present impression as to the extent of their separating?

(Question objected to as not proper cross-examination, being founded upon an assumed statement of the witness in the absence of his testimony given yesterday, which would speak for itself.)

(Counsel for complainant states that he asked this question because testimony given by the witness yesterday is not now present, and he desires to ascertain what the witness did state yesterday on this point as merely introductory to another question.)

A. 67. Four or five inches.

Cross-Q. 68. In the boats which the company are using what is the length of the gum spring to the claw-hooks to which the coupling chain is attached?

A. 68. I should think about fifteen to sixteen inches. I never measured them.

Cross-Q. 69. Are these springs inclosed in a cylindrical box, as shown in the model, Exhibit No. 19?

A. 69. Some of them are and some of them are not.

Cross-Q. 70. In the cases in which they are inclosed in a cylindrical box is there a nut on the end of the shank of the hook, as shown in said Exhibit No. 19?

A. 70. There is in all that I have noticed.

207 Cross-Q. 72. What is the space between said nut and its washer, if it has one, and the end of the cylindrical box?

A. 72. Very little or no space.

Cross-Q. 74. Could this spring be compressed to any greater extent than the space between the nut and the cylindrical box?

A. 74. The nut and washer bear against the gum spring and not against the box.

Cross-Q. 75. If there is a strain on the hook sufficient to carry the nut forward till it comes in contact with the end of box, would not the pressure then come upon the box rather than the spring?

A. 75. The washer does not come in contact with the end of the box; it passes inside.

Cross-Q. 76. Does the nut come in contact with the end of the box?

A. 76. It does not.

Cross-Q. 77. Then what prevents the shank of the hook from being drawn clear through the box?

A. 77. The spring and washer.

Cross-Q. 78. You said just now the washer does not come in contact with the box; then how does it prevent the shank from being drawn through the box?

A. 78. It is prevented by the gum spring, as I explained before.

Cross-Q. 79. To what extent would that gum have to be compressed to allow the boats to separate four or five inches longitudinally?

A. 79. To the extent that the boats separate.

Cross-Q. 80. To what extent would they have to be compressed to allow the boats to have a play laterally of from one to two feet?

(Objected to as assuming that the springs have to be compressed to allow the boats to have lateral play and assuming that the boats have a lateral play of from one to two feet without the witness having stated that fact.)

208 A. 80. Something less, as I stated before, than they had in the longitudinal play.

Cross-Q. 81. In the boats the company are using is the overhanging bumper on the forward boat of the form shown in Exhibit No. 19?

(Objected to as assuming that the company is using such boats.)
(Question withdrawn.)

Cross-Q. 82. In the coupled boats which the canal company own and which are in use on the Pennsylvania canal is the overhanging bumper on the forward boat of the form shown in Exhibit No. 19?

A. 82. The bumpers are not all precisely alike in form, but are practically the same thing.

Cross-Q. 83. In those which most nearly resemble the bumper shown in Exhibit No. 19 what is the width of the square or flat part of the bumper?

A. 83. I do not know; I think they are all wider than shown in the model.

Redirect:

Q. 84. Look at the photograph Exhibit W, and say if you can tell how wide the stern of the overhang of the forward boat is.

A. 84. No; I cannot.

A. WHITNEY.

Sworn and subscribed before me this 6th day of April, 1876.

S. BELL,
U. S. Commissioner, Special Examiner.

WILLIAM FRICK, a witness on behalf of the defendants, being duly sworn to tell the truth, the whole truth, and nothing but the truth, deposes and says:

Q. 1. What is your name, age, residence, and occupation?

209 A. 1. William Frick; I am 57 years of age; residence, Chester, Pa.; occupation, boat-builder.

Q. 2. How long have you been familiar with the construction and operation of canal-boats?

A. 2. I commenced my apprenticeship in 1836 and served under regular indentures, and have been in the business ever since; possibly built more extensively than anybody else in the business as to canal-boats.

Q. 3. Have you also operated canal-boats, or run them?

A. 3. Yes, sir; off and on I have been on the canal, running and owning them.

Q. 4. Are you the same William Frick to whom a patent, No. 82614, was granted September 29th, 1868, for improvement in steering apparatus in sectional boats?

A. 4. My name is William Frick, and I obtained a patent. It was dated September 29th, 1868. It was for improvement in steering and coupling canal-boats.

Q. 5. Did you have a pair of boats coupled, one of which was named the "William P. Jenks;" and, if yea, when?

(Counsel for complainant objects to any testimony from this witness to prove prior knowledge or use of the invention in controversy on the ground that no foundation is laid for such testimony in the answer.)

A. 5. That boat commenced running in 1868.

Q. 6. Please state if at that time you had a pair of claw-hooks. And if yea, can you produce the same?

(Objected to for reasons above stated.)

A. 6. At that time, or shortly after, I put these identical hooks on the "William P. Jenks;" took them to the boat and put them on the boat.

(Witness refers to two (2) iron claw-hooks which he produces, and which are put in evidence and marked "Defendant's Exhibit No. 20.")

I took them off the boat and have cared for them myself.

Q. 7. You say shortly after or at that time you put these hooks on the boat. Fix the time, at least the year, when this was done.

(Objected to.)

210 A. 7. The boat was put on the canal September, 1868; these were put on shortly after. You can prove them on the boat that fall by other witnesses.

Q. 8. Name one or two, if you can, who know of their being there at that time.

A. 8. Charles Barkelbach was on the boat at the time.

Q. 9. How long have you known canal-boats to be used with projecting sterns or cut-waters at the bow and with overhanging guards or bumpers at the stern?

A. 9. 'Way back as far as 1840. I recollect seeing them on when I was an apprentice. I helped to put them on.

Q. 10. In building boats, single boats, up to 1870, say, was it a rule to build them with overhangs, guards, or bumpers at the stern, and with projecting sterns or cut-water?

A. 10. It was a rule always to put a stern to a boat, which some people call a cut-water. Those guards were put there as a protection to the stern.

Q. 11. Look at the model now shown you and state, if you know, what boats had the projecting stern in front and the projecting guard on the stern below the line of the deck, as represented in these models, and when such boats were used.

(Complainant's counsel objects to the question on the ground that if it is intended to prove any prior knowledge or use of the invention the evidence is incompetent under the answer.)

A. 11. We built boats of that kind for the Delaware and Hudson Canal Company along from 1852 up to—for several years—we built quite a number of them; we also built for the Pennsylvania Coal Company of New York; we also built for the Schuylkill Navigation Company boats of that kind. Some had the overhang guards higher and some lower than shown in this model as early as 1848.

(Model put in evidence, marked Exhibit No. 21.)

Q. 12. On your build of boats what provision in the way of cleats did you usually have, and where were they located?

A. 12. I put a cleat on the forward quarter, on the mid-
211 ships, and in the stern quarter on each side of the boat. I put a cleat on the bow of the "William P. Jenks," and a cleat on the stern, which would be eight cleats altogether. All the cleats I put on fore and aft with the boat.

Q. 13. Do you know of any instances in which cleats were put on canal-boats at the stern or near the stern crosswise instead of fore and aft?

A. 13. The after boat, the "Jenks," had eight cleats on; the forward one had but seven. I don't think we had one on the after end of the forward boat.

(Question objected to as leading.)

Q. 14. Are the cleats on canal-boats generally all arranged as you arranged those you mentioned; if not, how otherwise?

A. 14. All the difference I know of is, some people put cleats crosswise on the bow and crosswise on the stern.

Q. 15. How long have you known these crosswise cleats to be?

A. 15. I can't give you the exact length; fore-and-aft cleats we have made as long as three feet, some three and a half.

Q. 16. Were these crosswise cleats used prior to 1870; and, if yea, how long prior?

(Objected to as leading and immaterial.)

A. 16. I have seen them as far back as the old Union boats.

Q. 17. How far back is that?

A. 17. I think the old Union boats have been out of existence twenty years. I mean by the old Union boats the boats that were used before the Union canal was enlarged.

Q. 18. What was the purpose of the two hooks, "Exhibit 20," when you put them on the "Jenks"?

(Objected to as incompetent under the answer.)

A. 18. They were put on for the purpose of fastening the end of the chain to; they were intended to be fastened on the stern quarter of the forward boat for the purpose of fastening the end of the chain to.

212 Q. 19. Had you prior to that time seen similar hooks in use on board vessels; and, if yea, for what purpose?

(Objected to as incompetent under the answer, and also as leading.)

A. 19. I have seen them used on board vessels for hauling chains—similar hooks. I have also seen similar hooks about chain stores where they handle chains a good deal.

Cross-examined:

Cross-question 20. On what part of the "William P. Jenks" were these hooks, marked "Exhibit 20," put?

A. 20. They were in the cabin of the forward boat.

Cross-Q. 21. Were they made fast to any part of the boat in the cabin?

A. 21. No, sir.

Cross-Q. 22. Were they ever made fast to any part of the boat?

A. 22. Not that I see.

Cross-Q. 23. When you stated that you put these hooks upon the "William P. Jenks," did you not intend it to be understood that they were attached in some way to that boat?

A. 23. No, sir; I didn't intend any such thing. I did not intend to convey the idea that they were attached to the boat.

Cross-Q. 24. You say you have seen similar hooks on board vessels for hauling chains. Do you mean that they were attached to the vessel?

A. 24. No, sir; I said they were for hauling and handling chains

Cross-Q. 25. The boats you say you built like Defendant's Exhibit No. 21. Were they single or double boats?

A. 25. They were single.

Cross-Q. 26. They never were intended to be coupled, were they?

A. 26. Not just like them.

213 Cross-Q. 27. Were they intended to be coupled at all—that is, so that one boat would be drawn by the other?

A. 27. Prior to 1866 or 1865 those that I saw with the fenders on were similar to this, but were not coupled. I didn't suppose they were intended to be coupled.

WILLIAM FRICK.

Sworn and subscribed before me this 6th day of April, A. D. 1876.

S. BELL,
U. S. Commissioner, Special Examiner.

Adjourned, by consent, until further notice.

214 Depositions of witnesses on behalf of defendants in above cause, taken before Samuel Bell, U. S. commissioner, special examiner, at the office of Henry Baldwin, Jr., Esq., No. 217 South Sixth street, Philadelphia, Pennsylvania, on the 15th day of May, at 1½ o'clock p. m., and on subsequent dates, by adjournment.

Present: Mr. Henry Baldwin, Jr., Mr. A. B. Shearer, for defendants, and Mr. J. J. Coombs, for the complainant.

Adjourned until 10 o'clock a. m., 16th inst., without taking testimony, on account of the non-attendance of witnesses.

TUESDAY, *May 16th*, 1876.

Present: Mr. Henry Baldwin, Jr., Mr. A. B. Shearer, and Mr. J. J. Coombs.

Defendants offer and put in evidence certified copies of letters patent No. 45039, to Eldridge Heath, November 15th, 1864, marked Defendants' Exhibit No. 22.

Also letters patent No. 45720, to Walter Ingalls, January 3d, 1865, marked Defendants' Exhibit No. 23.

Also letters patent No. 53088, to Stackpole, Spear & Cobb, March 6th, 1866, marked Defendants' Exhibit No. 24.

Also certified copies of the following English letters patent, viz., No. 11044, January 16th, 1846, to Peter Taylor, marked Defendants' Exhibit No. 25.

Also No. 1795, June 26th, 1857, to John Bourne, marked Defendants' Exhibit No. 26.

Also No. 330, February 7th, 1862, to William H. Bartholomew, marked Defendants' Exhibit No. 27.

Also the following Patent Office copies, not certified, but which complainant's counsel admits, without formal proof, the same as if certified, viz., patent No. 86737, to De Nesmil & Eyth, February 9th, 1869, marked Defendants' Exhibit No. 28.

215 Patent No. 82614, to William Frick, September 29th, 1868, marked Defendants' Exhibit No. 29.

Also reissue No. 5000, dated July 23d, 1872, to William Frick, assignor of Charles H. Frick, marked Defendants' Exhibit No. 30.

The last mentioned being a certified copy.

Complainant's counsel admits that Charles Barkelbach would testify that the claw-hooks, Defendants' Exhibit No. 20, were put on board of the "William H. Jenks" in the year 1868 or 1869, lying loose in the cabin, and not attached to any part of the boat, as testified to by defendants' witness, William Frick, and complainant's counsel waives any objection that has been or might be taken to the proof.

Complainant proposing to examine certain witnesses that are in attendance, defendants suspend for that purpose.

THEODORE BERGNER, a witness on behalf of the defendants, being duly sworn, deposes and says:

Question 1. What is your name, age, residence, and occupation?

Answer 1. Theodore Bergner; I am 42 years of age; I am a mechanical engineer by profession, and I reside at No. 505 North Twenty-first street, Philadelphia.

Q. 2. Please state the general scope of your familiarity with specifications and drawings of mechanical devices.

A. 2. Mechanical drawing has been my constant occupation since my eighteenth year, and during the last eighteen years I have had charge of the drawing department of the establishment of Messrs. William Sellers & Co., during which time I have not only been engaged in designing machinery, but also in preparing all, or nearly all, of the drawings for patents taken out by Messrs. William Sellers & Co. in various branches of machinery.

Q. 3. Have you read and do you understand the contents of a copy of the letters patent No. 129,844, "Complainant's Exhibit No. 8," in this case?

A. 3. I have read this patent, and believe I fully understand its contents.

216 Q. 4. Have you read and do you understand the contents of a copy of reissued patent No. 5630, Complainant's Exhibit No. 9, in this case?

A. 4. I have read the specification and think I understand it also.

Q. 5. Please compare the drawing, Fig. 1, of the patent No. 129,844, and the drawing of the reissue No. 5630, and specify such differences, if any, as you find between those drawings.

A. 5. The most essential difference between the two drawings I find to exist in the manner in which the ends of the chain marked "D" are attached to the stern of the forward boat. In the drawing of No. 129,844 the ends of this chain are so attached to the extreme outer end of the stern as to form a very obtuse angle, while in the drawing of reissue No. 5630 the attachment of the ends of the chain "D" is made at two points so far forward of the stern line that the angle of the chain "D" thereby becomes a more active one.

Q. 6. How do you find in those figures the chain "D," attached to or connected with the stern of the boat marked "B"?

A. 6. I find in both cases this connection to be formed by a pin

passing vertically through a link of the chain "D," this pin being confined in the projecting stem of the rear boat and the chain drawn tight between its outer fastenings, so as to give it a tendency to hold the bow of the rear boat in contact or nearly in contact with the stern of the forward boat. In practice, however, the arrangement shown in No. 129,844 will be far less adapted to hold the two vessels in contact than the modified arrangement or angle of chain shown in the reissue No. 5630.

Q. 7. From the drawings how do you understand the chain "D" to be arranged on the stem—on top or below the top of the stern?

A. 7. Both drawings clearly show the chain to be secured to the rear boat below the top of the stern.

217 Q. 8. How do the drawings show the ends of the chain "D" to be attached to the front boat?

A. 8. In the first drawing, No. 129,844, the fastening- of the chain to the stern are not distinctly shown, a portion of the steering chain "A" passing across the line of these fastenings. In the reissue, however, in which these fastenings of the chain "D" are placed closer together, and upon the deck of the forward boat the claw-hooks used as a fastening are clearly indicated.

Q. 9. Please state what, if anything, you find in the specifications of the patent No. 129,844 describing or indicating the means by or mode in which the ends of the chain "D" are secured to the stern of the forward boat.

A. 9. I find the means or mode of fastening indistinctly represented, but its location is shown to be at the extreme end or outer line of the stern of the forward boat. The specification describes the ends of the coupling chain attached to one of the boats by means of crow-foot claw-hooks.

Q. 10. Is the chain thus described as a coupling chain the chain marked "D" in the drawing?

A. 10. It is.

Q. 11. What else does the specification say about that chain?

A. 11. It states that the central part of this chain "D" is linked to the cut-water or to a central point on the forward end of the rear boat, the said chain being so attached to the forward boat as to have a little slack. The attachment to the rear boat shall be on a projecting or overhanging guard or bumper, so that the connection will form a universal joint between the adjacent ends of the two boats and allow the boats to assume any angle in respect to each other vertically or laterally.

Q. 12. In what part of the specification of the patent No. 129,844 do you find the chain "D" designated as a coupling chain?

A. 12. I do not find the chain "D" designated as a coupling chain in any part of that specification.

218 Q. 13. Do you find any, and, if yea, what, designation of a coupling chain in that specification?

A. 13. I find the chain "A" designated as a coupling and steering chain, passing around pulleys "*d d*," "*e e*," and "*f f*."

Q. 14. Do you find in the specifications any description of the

means by which the ends of this chain "*a*" are secured; and, if yea, what are those means?

A. 14. These means are described as consisting of claws or claw-hooks or the claws of a crow-foot.

Q. 15. Where in the specification do you find the statement that the chain "D" is secured by similar means?

A. 15. The specification does not describe the means of fastening the ends of the chain "D" or does not indicate the precise manner of fastening.

Q. 16. In your tenth answer you say the chain thus described as a coupling chain is the chain marked "D" in the drawing. How do you reconcile that with your subsequent answer?

A. 16. I was in error when I called the chain "D" the coupling chain.

Q. 17. In the specification of the reissue No. 5630 do you find the means of securing the ends of the chain "D" specified; and, if yea, what are those means?

A. 17. The chain "D" is described as attached to the forward boat at points "*h*" "*h*," and the drawing shows these fastenings to resemble clearly the claw-hooks "*h*."

Q. 18. What does the specification of the reissue say in respect to the claw-hooks?

A. 18. This specification describes the second part of the improvement—"consist in attaching the ends of the coupling and steering chains to the boats by means of crow-foot claw-hooks, so as to render the chains easily adjustable." In the specification Fig. 1 is described as a top view of a pair of boats coupled and centred together, etc. Fig. 2 is a detached view of one of the claw-hooks, to which the ends of the coupling chains are attached. Previous to the claims
219 the following sentence occurs in No. 5630: "The coupling and steering chains are attached to the forward boat by slipping one of the links edgewise between the claws of the crow-foot. They may thus be easily and quickly adjusted to any degree of tautness or slackness desired.

Q. 19. Do you find a corresponding paragraph in patent No. 129,844?

A. 19. A corresponding paragraph in the specification of No. 129,844 reads thus: "The coupling and steering chain is attached to the forward boat by slipping one of its links edgewise between the claws of the crow-foot. It may be thus easily adjusted to any degree of tautness or slackness desired."

Q. 20. State if you know whether a claw-hook was a new thing in 1872; and, if not, in what form or for what purposes such hooks were used prior thereto.

(Objected to on the ground that the answer does not set up any prior knowledge of any part of the invention claimed as having been possessed by this witness.)

(Defendant's counsel replies, The question is asked to show the state of the art and not with the expectation of proving by the witness an anticipation of the second claim of the reissue No. 5630.)

A. 20. I do not think that the claw-hook was new or original at that time. I have used a hook constructed precisely similar for securing the end of a cord in a drawing board, in which this cord formed the means of giving a parallel motion to the ruler or blade, the cord being at one end provided with a series of knots, one of which, producing the required tautness of the cord, was placed behind the claws of the forked hook, which admitted of instant attachment. This board, including claw-hook and cord, I have used since the year 1869 here in Philadelphia and am using it now. Claw-hooks have been used for pulling nails or tacks in various forms of instruments for many years.

Q. 21. Please look at the model, Exhibit J J J No. 16 and
220 say if you understand the connection of the steering chain and the coupling chain to the claw-hooks as represented in this model.

A. 21. I do understand that connection.

Q. 22. And do understand the operation of that connection?

A. 22. I think I fully understand the operation.

Q. 23. Do those claw-hooks perform any, and, if yea, what, function in that connection?

A. 23. They provide a means of readily shortening or lengthening either of these chains to the extent of one or more links.

Q. 24. Suppose a short straight pin was substituted for these claw-hooks and the links of the chain large enough to drop over the pins, how would that operate in the respect you have specified?

(Objected to as irrelevant and immaterial.)

A. 24. Such a pin would in practice answer the purpose of the claw-hook if bent back to prevent the lifting out of the chain. It would simply be then a single hook instead of a double one, which single hook might even be preferable, in view of the vibrating movement of the chain.

Q. 25. In combination with the boats A and B and the coupling and steering mechanism described in the reissue No. 5630 and as represented in this model No. 16, what function do the claw-hooks perform to constitute them an element of a combination, mechanically speaking?

A. 25. They perform no function other than that of a fastening for the chain.

Q. 26. Have you read and do you understand the contents of English letters patent to John Bourne, No. 7795, dated June 26th, 1857, a certified copy of which, Defendant's Exhibit No. 26, is now shown you?

A. 26. I have read the contents of this patent and think I understand it.

Q. 27. Do you find represented and described in that Exhibit No.
26 a combination of two boats, a steering chain passing around sheaves or pulleys and around a windlass or its equivalent,
221 and a connection between the two boats, forming a universal joint between them and keeping them coupled and centred substantially as described and shown in the reissue 5630? If yea,

particularize the same and point out such differences, if any, that you find between the two patents.

A. 27. I find that patent to embrace the coupling for two boats in a manner whereby they are kept properly centred. I also find a steering chain passing around sheaves or pulleys and operated by a windlass, or, as the specification states, "this apparatus may be exchanged for any equivalent deflecting apparatus producing a similar result, the only material point being that the articulations should be such as to enable the train to bend in any required direction." The steering device I find clearly shown in figure 2 of sheet 2 of the drawings. In the same figure are also represented two rods, both attached at one end to a common universal joint in the stern of the forward boat, these rods diverging and taking hold of the bow of the rear boat at two points, the position of the two rods being such as to form nearly a right angle. It is stated in that specification that "it is quite immaterial whether the stern of the steamer is made concave or convex, and it is also immaterial whether the barges are made alternately with two convex ends and two concave ends, or whether there is one concave and one convex end to each, the only material point being that the articulation should be such as to enable the train to bend in any required direction." The first claim is for "the combination into an articulated or jointed train, in the manner described, of a steamer and one or more barges, the articulation being of the nature of a ball-and-socket joint, so as to permit both lateral and vertical deflection." The second claim is for "the steering or guiding such a train by accomplishing, by means of any suitable apparatus, the deflection of all or any of the barges." The steering apparatus I find in all important respects to be the same as that described in the reissue No. 5630.

222 (The last sentence of this answer objected to as altogether indefinite, and does not show in what respect this steering device in the English patent resembles or corresponds with steering mechanism in complainant's patent.)

Q. 28. Please specify more in detail the coupling and the steering mechanism described in Exhibit No. 26, with reference to the drawing and the relation maintained between the boats by the coupling and steering connection.

A. 28. The coupling connection is described and shown as consisting of two draw-bars attached to a common centre "A," and on the deck of the forward boat, and to strong pins or spindles on the deck of the rear boat at "B B." These rods are described as keeping the constituent barges of the train at the right distance apart, and preventing them from touching one another or from too great a space between them, the barges being thus articulated to one another by circular joints, so as to admit of vertical and lateral deflection, the contiguous ends of the two boats remaining properly centred in all states of deflection. The deflecting apparatus is described and shown as consisting of an ordinary steering wheel and chain-barrel, upon which the chain "C C" is wound in the usual manner, and this chain passes over pulleys at "E E," attached to

the barge, and pulleys at "D," attached to the steamer, while the ends of the chain are attached to the barge at the points "B B." The description continues: It follows from this arrangement that when a strain is put upon the chain the points "D" and "E" approach one another either upon one side or the other, depending on the direction in which the steering wheel is turned, and the steamer is thus set at any desired angle with the train, whereby the direction which she pursues through the water is correspondingly affected. The same species of apparatus is employed to deflect the last barge of the train, and also all or any of the intermediate barges, and this apparatus may be exchanged for any equivalent deflecting apparatus producing a similar result.

223 Q. 29. As an engineer, what do you say as to the *suffering* of the description and drawings in this patent, Exhibit 26, for the construction and operation of a pair of coupled boats, to be operated as described?

A. 29. I think that the drawings and description are quite sufficient to enable any one skilled in the art or any mechanic of even moderate ability to understand and carry out the construction.

Q. 30. How far, in your opinion, does the Exhibit 26 describe and show a pair of boats and a train coupled and provided with steering and centring mechanism substantinlly as described and shown in the reissue No. 5630?

A. 30. I think the construction of the centring, coupling, and steering devices described in Exhibit No. 26 embraces all the assential features described in the reissue 5630.

Q. 31. Within the scope of the suggestion in the patent, Exhibit No. 26, of the substitution of equivalent devices for those particularly described to obtain the articulation and deflection of the coupled boats, how far, in your judgment, would the substitution of the chain "D" of the reissue 5630, secured to the stem of the rear boat and the stern of the forward one, as specified in that reissue 5630, involve invention?

A. 31. I think the suggestions of the former patent, Exhibit No. 26, so broad and ample as to leave no room for invention in the substitution of a chain or rope or any other flexible connection for the one described in Exhibit 26.

Q. 32. Except in the use of the jointed rods in one case and the chain "D" in the other, how far do you find in the patent, Exhibit No. 26, what is described in the reissue No. 5630 and specified in the first claim thereof?

A. 32. Leaving aside the details of the steering mechanism, to which the improvements claimed in the reissue No. 5630 do not relate, I find that the functions of a centring and coupling device are fully attained in the construction described in Exhibit No. 26, and that there is no essential difference between the universal joint and rods in the first case and the chain in the latter.

224 Q. 33. Look at the Defendant's Exhibit No. 24 and state if you understand from the drawing forming part thereof how the boats are shown to be connected.

A. 33. These drawings show the boats connected by three links

of a chain, one attached to the contiguous ends of each of the boats, with a third loose link uniting them.

Adjourned until 2 o'clock p. m. Friday, 19th May, A. D. 1876.

FRIDAY, *May 19th*, 1876.

Present: Mr. Baldwin, Mr. Shearer, and Mr. Coombs.

Cross-examination of the witness, Mr. BERGNER:

Cross-question 34. Have you been in the habit of testifying in patent causes for many years?

A. 34. I have given such testimony in very few instances only.

Cross-Q. 35. In your answer to direct interrogatory No. 5 you say that the most essential difference that you find between the drawing, Fig. 1, of the patent, No. 129,844, and the drawing of the reissue No. 5630 exists "in the manner in which the ends of the chain marked 'D' are attached to the stern of the forward boat; that in the drawing of No. 129,844 the ends of this chain are so attached to the extreme outer end of the stern as to form a very obtuse angle, while in the drawing of reissue of No. 5630 the attachment of the ends of the chain 'D' is made at two points so far forward of the stern line that the angle of the chain 'D' thereby becomes a more acute one." Do you think that this is an essential difference between the construction shown by those two drawings?

A. 35. I think that the difference in angle of the two chains
225 affects the manner in which they are able to keep the two boats together; that is to say, while a very slight amount of slackness of the chain shown in No. 129,844 will allow considerable separation between the stern of the forward boat and the cut-water of the rear one, the same amount of slackness in a chain fastened in the more acute angle shown in No. 5630 will allow much less movement or separation of the two boats.

Cross-Q. 36. If the points of attachment of the chain on the forward boat are the same distance apart in both cases, would this result you have just named follow?

A. 36. Undoubtedly it must. The result is due to the difference in angle of the chain as shown in the two drawings.

Cross-Q. 37. If that chain was hooked up as tight as it could be drawn, could there be any slack exceeding the length of one link, provided the links did not stretch?

A. 37. In theory there could not be any such slack, but of the two chains the one shown in reissue No. 5630 is far more capable to resist any strain tending to separate the two vessels.

Cross-Q. 38. If when both the chains "D," as represented in these drawings, are hooked up as tightly as they can be drawn and then you let out one link of each chain, would the boats separate in the one case any more than in the other in consequence of the letting out of the link?

A. 38. There will be a decided difference in the amount of separation taking place by slack-ning each chain (1) one link.

Cross-Q. 39. Give the reason.

A. 39. I will here demonstrate it.

(Here follows diagram.)

226 I have made this drawing, in which the chains "D" are shown as taking hold at their respective angles with their points of fastening to the stern of forward boat at an equal distance apart, the distance "*a b*" being assumed as the length of one link of chain in both cases. This amount of lengthening throws the centre of chain from "*a*" to "*d*" in the case of the angle of 90° in No. 5630, while in the angle of 150°, which is that of chain No. 129,844, the centre of chain "D" is thrown back from "*a*" to "*o*," thus demonstrating clearly a very decided difference in the amount of separation taking place.

Cross-Q. 40. Do you find anything in either of these patents, Nos. 129,844 and 5630, specifying any particular points on the overhanging guard of the forward boat to which these chains are to be attached, independently of the drawings?

A. 40. The same sentence is used in the description of the original and reissue, viz: "B" is a chain the ends of which are attached to the rear overhanging guard of the forward boat at points *h' h'*; but the two claims differ from each other in the allusion to the chain "D." The first claim of No. 129,844 says, Chain "B" attached to an overhanging guard or bumper on one boat and the adjacent end of the other boat; while in the first claim the chain "D" is designated as attached to opposite points on the stern of the forward boat and to the stem or central part of the bow of the rear boat.

Cross-Q. 41. Assuming patent No. 129,844 to be a valid patent, do you think that any one could escape liability as an infringer who should construct and rig a pair of boats in the manner described and shown in said patent, by placing the points of attachment of the chain "D" a little further from the extremity of the overhanging guards than the points of attachment represented in the drawings of said patent?

227 (Objected to because it is not competent for the witness nor is the witness competent to construe the patent either as to its validity or invalidity, or as to what it would be valid for, or as — what would be an infringement or what would not be an infringement, or as to how far a chain in the thing described and represented would involve or evade liability as infringing.)

A. 41. In my opinion, this mere change in the points of attachment could not be made without infringing on the first patent, assuming it as a valid patent.

Cross-Q. 42. Referring now to the English patent of John Bourne, No. 1795, Exhibit No. 26, will you state whether that patent describes coupled boats for canal navigation?

A. 42. In that patent the terms "navigating shallow rivers" and "shallow waters" are used.

Cross-Q. 43. Referring now to McCreary's reissue No. 5630, what do you understand by the word "centred" in the first claim of said patent?

A. 43. I understand the term "centred" to mean that no lateral

deviation shall occur between the adjacent stern and bow of the two boats.

Cross-Q. 44. In your answer to question No. 27 you say that in figure 2 of sheet 2 of the drawings of said English patent No. 1795, Exhibit No. 26, you find that patent to embrace the coupling in a manner "whereby they are kept properly centred," and in answer to question No. 28 you say, in describing the coupling and steering connection described and shown in said patent, "The barges thus being articulated to one another by circular joints, so as to admit of vertical and lateral deflection, the contiguous ends of the two boats remaining properly centred in all states of deflection." Now, please state what is your warrant for saying that said English patent either describes or shows any means of centring the two coupled boats in all states of deflection.

A. 44. I find the said English patent to describe a train of barges articulated to one another by circular joints, so as to admit of lateral and vertical deflection, and I also find a "suitable deflecting apparatus between each of the barges of the train so as to throw
228 them into a curve or circle, the action, in fact, resembling that which the muscles exert upon the vertebræ of a fish or other animal, and by this action the train is constrained to pursue the direction of the curve into which it is thrown;" and I find the point "A," in Fig. 2 of sheet 2, to be that which keeps the two boats properly centred.

Cross-Q. 45. In the quotations you have just made do you find one word in reference to keeping the boats centred?

A. 45. I do not; but I find in another part of the specification of said patent the following sentence: "I claim as of my invention the combination into an articulated or jointed train, in the manner described, of a steamer and one or more barges, the articulation being of the nature of a ball-and-socket joint, so as to permit both lateral and vertical deflection; and this articulation, in the nature of a ball-and-socket joint, in my opinion, constitutes a means or mode of centring in the sense explained in my answer to cross-question No. 43.

Cross-Q. 46. Now, referring to McCreary's reissue No. 5630, do you not understand the word centred, as used in the first claim of said patent, to mean that there shall be no lateral deviation between the centres of the adjacent stern and bow of the two boats?

A. 46. I do understand it so.

Cross-Q. 47. If the boats described in the English patent are articulated together by a joint corresponding to a ball-and-socket joint, would not the centres of the adjacent stern and bow necessarily deviate laterally whenever the boats should be deflected out of a straight line?

A. 47. The point "A" constituting the centre, about which the deflection takes place, the centre lines of the two boats will never deviate from that point. If this point be thrown a greater or lesser distance from the point of contact between the bow and stern of the

two boats, a greater or less amount of deviation will certainly occur at the point of contact between the two vessels.

Cross-Q. 48. Question repeated.

229 (Objected to as already asked and answered.)

A. 48. I have answered the question in accordance with my understanding of the same, which is that the point "A," in Exhibit No. 26, constitutes a ball-and-socket joint.

Cross-Q. 49. In answer to question No. 45 you quoted from one of the claims of the English patent the following words: "I claim as of my invention the combination into an articulated or jointed train, in the manner described, of a steamer or one or more barges, the articulation being of the nature of a ball-and-socket joint, so as to permit both lateral and vertical deflection." Do you understand from the language that the joint marked "A" on Fig. 2, sheet 2, is the joint referred to as being in the nature of a ball-and-socket joint?

A. 49. I do understand it so, and find myself correct upon further reference to a sentence in that English specification, Exhibit No. 26, which says that the barges are connected "to one another by means of the rods 'A B' 'A B,' turning upon the centre 'A,' from which point the ends of the barges are swept, so that the same distance is always maintained between the barges, at whatever angle they may be set."

Cross-Q. 50. The point "A" referred to is a ball-and-socket joint, is it not?

A. 50. It must be to admit of lateral and vertical deflection.

Cross-Q. 51. You have stated, in answer to question 47, that "if this point (A) be thrown a greater or lesser distance from the point of contact between the bow and stern of the two boats, a greater or less amount of deviation will certainly occur at the point of contact between the two vessels." Now, in a pair of boats constructed as shown in said drawing, what would be the effect of throwing the point "A" to a greater or lesser distance from the point of contact between the bow and stern of the two boats?

A. 51. Constructed precisely as shown in said Figure 2, the relative shapes of the bow and stern of the two adjacent boats require the point "A" to be maintained in the position shown,
230 placing it nearer to or farther from the point of contact will be inadmissible without a corresponding change in the radius of the two ends of the adjacent boats.

Cross-Q. 52. The boats would not turn at all if the point "A" was materially moved without a corresponding change of the radius of the two boats?

A. 52. They would not turn for the reason that the radius for proper action must be struck from the point "A."

Cross-Q. 53. When these two boats, as represented in the drawing, turn at the articulated connection between them do not the centres separate from each other more and more the farther the boats turn?

A. 53. They do not at their point of intersection in the joint "A." The centre lines of the two boats only separate from each other at the point of contact of the two boats.

Cross-Q. 54. I meant by the centres of the two boats the central points of the extreme ends of the contiguous ends, and with that understanding please answer whether the two centres would not separate more and more the further they turned.

(Objected to as already answered.)

A. 54. The said centre lines of the extreme adjacent ends of the two boats will certainly separate more and more with the increase of deflection.

Cross-Q. 55. Now if, instead of the two bars "A B," as shown in figure 2 of sheet 2 of the English patent, there was but one bar extending from the point "A" to the centre of the other boat, would not the effect as to turning be the same?

A. 55. It would not. The effect of the two bars is such as to allow the deflection to take place without actual contact between the two boats, while one bar would allow them to bear against each other in a manner involving very injurious friction between the surfaces of the two boats brought in contact.

231 Cross-Q. 56. If the single bar was confined between cast-iron standards on the rear boat so as to make a perfectly rigid attachment from the point of its attachment on the rear boat to the point "A," would the boats then turn without any more friction than with two bars, as shown in the drawing?

A. 56. They would, in a horizontal line of deflection only. No vertical deflection could take place without great additional friction at and strain upon the point of the cast-iron standards between which the bar is rigidly confined.

Q. 57. Referring now to McCreary's patent No. 5630 and to the first claim thereof, do you understand that said English patent describes and shows a boat so constructed and rigged that the two boats in turning would keep centred, substantially as described in said McCreary's patent?

A. 57. McCreary's patent describes the forming of a universal joint between the ends of the two boats by means of a chain, and I think the formation of a universal joint between the ends of the two boats is attained by the rods "A B," centred in one ball-and-socket joint; substantially the centring of the two boats, as in McCreary's reissue No. 5630, is attained in the English patent, Exhibit No. 26.

Cross-Q. 58. In the McCreary boats, as shown and described in his patent, would not the central points at the extreme end of the stern of the forward boat and the extreme end of the bow of rear boat remain substantially together, to whatever degree the boats should be deflected, referring to model J J J No. 16?

(Objected to because the patent does not show the same connection of the coupling chain as shown in the model J J J No. 16.)

(Question withdrawn.)

Cross-Q. 59. In the McCreary boats, as shown and described in his patent No. 5630, would not the central points at the extreme end of the stern of the forward boat and the extreme end of the bow of the rear boats remain substantially together, to whatever degrees the

boats should be deflected, the chain "D" being hooked up tight?

232 A. 59. The centres of the bow and stern of the two adjacent boats will remain substantially centred, as shown in the drawing of reissue No. 5630, the only deviation taking place at the actual point of contact being due to the distance at which the fastening of the chain "D" to the bow of the rear boat occurs in the rear of the actual point of contact, which in the drawing is represented as a moderate distance.

Cross-Q. 60. Referring to Fig. 1 of sheet 1 of the drawing of the English patent and to Fig. 1 of the sheet 2 of same patent, state whether these figures do not show the adjacent ends of both boats, vertical from top to bottom.

A. 60. Figure 1 of sheet 2 shows the adjacent ends of both boats vertical, with a slight space between them. The other views referred to in the question do not indicate this.

Cross-Q. 61. With a space no wider than is indicated in these drawings, could the adjacent ends of the boats be vertically deflected by rising on a wave to any considerable degree without breaking the connecting bars "A B," "A B"?

A. 61. They could only be slightly deflected vertically without such strain when rising on a wave.

Cross-Q. 62. Do you find in McCreary's reissue No. 5630 any articulated connection between the two boats?

A. 62. As I understand the term articulated, I think such connection exists.

Redirect:

Q. 63. You have spoken of the point of contact between the two boats in Exhibit No. 26. What point do you mean and where do those boats come in contact?

A. 63. When I used the term point of contact in refer-ing to the boats described in Exhibit No. 26 I meant the parts of the two vessels in close proximity; the actual point of contact really exists in the joint "A," though the hulls of the boats do not touch each other.

Q. 64. How many ball-and-socket connections do you find represented in the drawing of Exhibit No. 26 between the bolts and the bars "A B"?

233 A. 64. There are three such ball-and-socket joints represented.

Q. 65. Do you understand the patent No. 26 to include only the particular device shown for affecting the articulation between the two boats?

(Objected to as calling for a construction of the patent.)

A. 65. I understand it to include such other devices by which the two boats are enabled to bend in any required direction without any considerable space left between them.

Q. 66. Do you find the description in that patent limited to boats having their adjacent ends respectively as shown in the drawing? If not, what other form do you find stated?

(Objected to as above.)

A. 66. I find it stated as immaterial whether the barges are made alternately with two convex ends and two concave ends or whether there is one concave and one convex end to each, etc.

Q. 67. In the drawings showing the articulation by the ball-and-socket joints don't the bars "A B" act as a bridle, checking the boat on either side?

A. 67. They do not check the deflecting motion of the boats.

Q. 68. Is there anything described and shown that does, and what is it?

A. 68. I find described and shown a check-chain "M," to prevent the steamer from being angled so far as to cross the points "E E" of barge to jam against the sides of the steamer.

Q. 69. In patent No. 5630, if the coupling chain "D" was so slack as to permit lateral movement of, say, two feet either way, would the boats be kept centred under all conditions?

(Objected to on the ground that no such slackness of the chain is described or alluded to in McCreary's patent No. 5630.)

A. 69. In my opinion they would not.

Q. 70. If the boats shown in patent 5630 were coupled together so closely as to keep the stem and stern substantially in con-
234 tact how much could they be deflected vertically without coming together or tearing away the coupling chain?

A. 70. Any further vertical deflection of the two boats after they are brought in actual contact would throw such strain on chain "D" as to break it or its fastenings.

Q. 71. You have shown that the greater the angle between the attachment of the chain "D" to the stem of the rear boat and the points of its attachment on the front boat the greater the distance to which they would separate with a given amount of slack in the chain. How is it as to the effect of the distance to which the boats are separated, as to the greater or less extent of deflection laterally out of centre?

A. 71. A greater amount of lateral or vertical deflection is admissible in proportion to the distance at which the boats are separated.

Q. 72. And the more slack the greater the lateral play?

A. 72. That will be the effect.

Recross-examined:

Cross-Q. 73. Referring to your answer to question No. 66 when you say, "I find it stated as immaterial whether the barges are made with two convex ends and two concave ends or whether there is one concave and one convex end to each." Do you understand from this language quoted from the English patent that the patentee contemplated uniting the boats in any other way except with the concave end of one fitting into the convex end of the other?

A. 73. From the continuation of the sentence quoted, which reads, "the only material point being that the articulation should be such as to enable the train to bend in any required direction," and from the first claim for "the combination into an articulated or jointed train in the manner described," the articulation being of the nature

of a ball-and-socket joint so as to permit both lateral and vertical deflection, I do not think that the inventor confined himself
235 to any particular conformation of the bows and sterns of his boats.

THEODORE BERGNER.

Sworn and subscribed before me this 20th day of May, A. D. 1876.

SAMUEL BELL,
Special Examiner.

As tending to show the state of the art, and for no other purpose, defendants offer and put in evidence a certified copy from the Patent Office, in the matter of English letters patent granted W. H. G. Field, dated June 16th, 1853, No. 1460, for constructing and steering barges and vessels, being a provisional specification and drawing, marked Defendants' Exhibit No. 31.

Complainant's counsel objects to the introduction of this document—

1st. Because it is not in any way referred to in defendants' answer or supplemental answer.

2d. Because, being a mere provisional specification never carried to patent, it is not competent evidence for any purpose.

3d. Because it is now past seven o'clock p. m. on the fifth day of this meeting, and it is offered in evidence for the first time after complainant has concluded his cross-examination of the last witness produced by the defendants, and because it was distinctly understood that no other witness would be examined by the defendants at this meeting, and because complainant or his counsel had no knowledge of this patent or the intention to put it in evidence until it was produced a few minutes ago.

Defendants' counsel deems it only necessary to reply that he has not proposed and does not propose to examine any witness in regard to this Exhibit No. 31 nor to examine any other witness at this meeting, and he deferred the offer and introduction of the
236 exhibit simply because he did not propose to examine any witness about it and had overlooked it in putting in his documentary evidence; and he submits that, as complainant will have ample opportunity of examining and rebutting anything he may find in it, the simple question is as to the competency of the proof and not as to the order of its introduction, and hereupon defendant closes.

237 McCREARY *vs.* PENNA. CANAL CO. } U. S. C. C., E. D. of Penna.

DEF'D'T'S EXHIBIT No. 22. Sam'l Bell, Sp. Ex'r.

THE U. S. PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Eldridge Heath, dated November 15, 1864, No. 45039, for "improved sectional boats."

In testimony whereof I, R. H. Duell, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto [SEAL.] affixed this sixth day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

R. H. DUELL,
Commissioner.

238 THE UNITED STATES OF AMERICA:

To all to whom these letters patent shall come:

Whereas Eldridge Heath, of Rochester, New York, has alleged that he has invented a new — useful "improved sectional boat," which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said invention, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said invention, and praying that a patent may be granted for that purpose: These are, therefore, to grant, according to law, to the said Eldridge Heath, his heirs, administrators, or assigns, for the term of seventeen years from the fifteenth day of November, one thousand eight hundred and sixty-four, the full and exclusive right and liberty of 239 making, constructing, using, and vending to others to be used the said invention, a description whereof is given in the words of the said Eldridge Heath in the schedule hereunto annexed and is made part of these presents.

In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office has been hereunto affixed.

Given under my hand, at the city of Washington, this [SEAL.] fifteenth day of November, in the year of our Lord one thousand eight hundred and sixty-four, and of the Independence of the United States of America the eighty-ninth.

W. T. OTTO,
Act'g Secretary of the Interior.

Countersigned and sealed with the seal of the Patent Office.

D. P. HOLLOWAY,
Commissioner of Patents.

240 *The Schedule Referred to in These Letters Patent and Making Part of the Same.*

To all whom it may concern:

Be it known that I, Eldridge Heath, of Rochester, in the county of Monroe and State of New York, have invented a *a* new and useful improvement in sectional boats; and I do hereby declare that the following is a full, clear, and exact description thereof which will enable others skilled in the art to make and use the same, reference

being had to the accompanying drawing, forming part of this specification, in which—

(Here follows diagram marked p. 245.)

Figure 1 represents an elevation of a vertical longitudinal section of a canal-boat which contains my improvements, taken on the line *x* in figure 2.

Fig. 2 is plan view of the boat. Similar letters of reference indicate like parts.

My improvements can be applied to any form and character of boats which is or may be used in navigating quiet waters.

I have shown a boat composed of only two sections, but my invention is equally applicable to a greater number.

241 A is the forward section and B the aft section of the boat. Each is to be provided with a steering apparatus, which is here represented by a rudder blade, C, and stern post and handle fixed in the stern of each section; but in practice I prefer a wheel, which I mean to place on the forward part of section B, so that the helmsman shall be nearly in the centre of the boat, in this example of my invention, and thus be within the reach of the lever *x* which operates the machinery or dead-eyes for disconnecting the sections and near at hand to assist in connecting the same. U represents the arrangement of the ordinary dead-eyes for casting off the tow-line from canal-boats while the team is pulling, and it consists in hooks W, which are pivoted in or about the level of the deck floor at either side of the deck, the hooks being above the deck, so as to take into the eyes of the connecting ropes or chains *j* and their shanks, which are heavier than the hooks, extending below the deck, where they intersect latches 1, secured to the under side of the deck, their inner ends being each jointed to the horizontal connecting plate or rod W^1, to which the rope or chain V is fastened at 2. The chain V is carried along through pulleys to a vertical windlass or shaft *x*, whose arbor extends through the deck, where it is operated by a crank or other suitable device. A spring bears against the

242 frame of the dead-eyes, as at 3, where a spring is shown bearing against one of the latches, 1, in a direction against the pull of the chain V, so that the latches will always be in a line at right angles to the plate or rod U, and thus be always in position to lock the shank of the hooks W.

The operation is as follows:

When it is necessary to disconnect the sections the helmsman turns the crank of the windlass *x*, which takes up the rope V and draws the plate U to one side, and thus detaches the jointed latches 1 from the shanks of the hooks W, which will then yield to the strain of the ropes *j* and incline to the forward part of the section so that the eyes of the ropes will slip over them. The weight of the shanks of the hooks W will assume a vertical position so soon as the ropes *j* are cast off so as to bring them again in position to be caught by the latches 1.

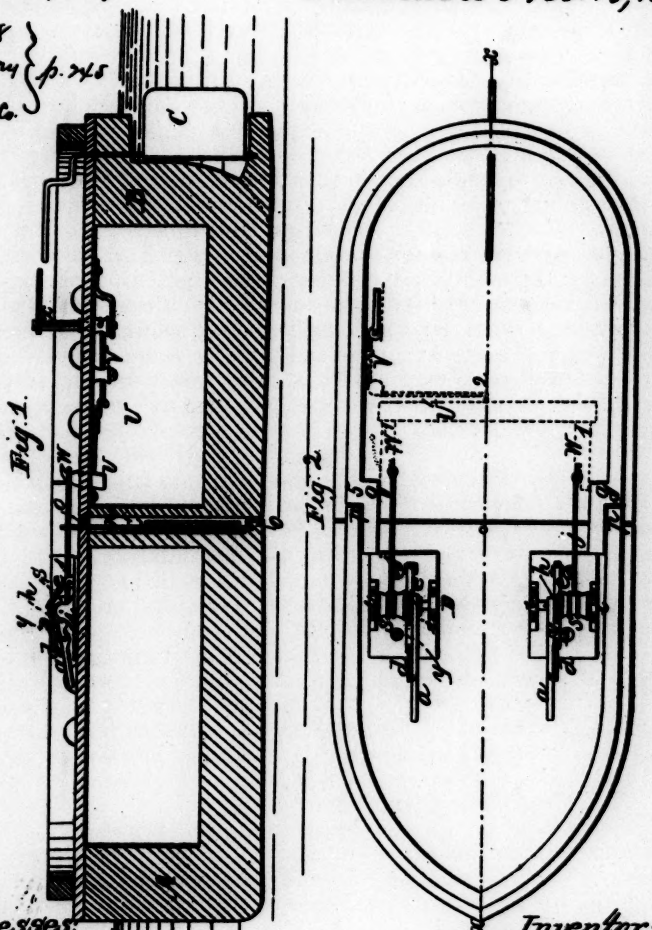
Upon the aft of the deck of the forward section B, I place two windlasses, D, in line with the hooks of the dead-eyes, whose shaft

E. Heath.

Towing.

No. 45,039. Patented Nov. 15, 1864.

No. 368 McCreary v. Pa. Canal Co. } p. 245



Witnesses;
C. L. Topliff
Henry A. Corns

Inventor;
Eldridge Heath
per Munn & Co
attys.

and pulley S are rigidly secured to a ratchet wheel *h*. A pawl, *y*, is hinged to a pawl arm, *a*, which is free upon the shaft of the windlass, and the spring *d* keeps the pawl in contact with the ratchet. On the opposite side of the windlass is a hook detent, *e*, which engages the ratchet and prevents the backward rotation of the
243 windlass. Each windlass is constructed alike.

Its operation is evident from the drawing without further description.

A cavity or recess, *u*, is formed between any two sections of the boat, at their junction, in order to receive the rudders of the forward section and its appurtenances. It is made in this example of my invention by extending the shell of the forward section on its bottom sides and deck, as at O, so as to meet the shell or planking of the aft section, which is flush with the forward wall of that section, or the shell or planking of such section may project beyond the frame of their sections so that the cavity *u* shall be formed of the sum of the recesses in each section.

The rails *h* of the forward section of the boat extend aft beyond its stern, as shown in Fig. 2, and rests upon the deck of section B. The rail *q* of that section is likewise extended so as to rest upon the deck of section A, being enlarged at that part so as to permit a shoulder, 5, to be formed on it to receive the end of the rail *p*. Both rails may be formed with shoulders if that plan is preferred.

The extensions of the rails *p* and *q* are to be securely locked or attached in any convenient way to each other and to the sec-
244 tions when they are thus lapped.

This method of interlocking the sections of a boat by extending their rails over the decks of each other, in connection with the windlass and chains, forms a very secure and rigid connection sufficient for all practical and useful purposes in smooth water, and each two adjacent sections must be so trimmed that the bow of the one, say A, and the stern of the other, say B, shall be a trifle deeper in the water than the ends which are joined together.

I claim as new and desire to secure by letters patent—

1st. The recess or cavity O between two adjacent ends of the sections of a boat, substantially as described.

2d. The combination of the windlass and chain, the dead-eye arrangement W, and the extended rails *p* and *q* for the purpose of connecting adjacent sections of a boat, substantially as described.

ELDRIDGE HEATH.

Witnesses:
JOHN W. MARTIN.
HOMER HALSTEAD.

Ex'd: M. C. S.

247 UNITED STATES PATENT OFFICE.

WALTER INGALLS, of Sanbornton, New Hampshire.

Improved Attachment of Trains of Boats.

Specification forming part of Letters Patent No. 45720, dated January, 3, 1865; antedated September 12, 1863.

To all whom it may concern:

Be it known that I, Walker Ingalls, of Sanbornton, county of Belknap, and State of New Hampshire, have invented new and useful improvements in boats and their navigation on rivers and canals; and I do hereby declare that the following is a full and exact description of the construction and operation thereof, reference being hereby had to the accompanying drawings, and to the letters of reference marked thereon, which drawings make a part of this specification.

Like letters represent and refer to like or corresponding parts.

(Here follows diagram marked p. 246.)

Figure 1 is a top view of three boats, A, B, and C, connected together and forming one continuous line or train in the manner and by the means hereinafter described. Fig. 2 is a side view of the line or train of boats shown at Fig. 1. Fig. 3 shows the manner in which the coupling or connecting joint hereinafter described operates. Fig. 4 shows the stern of the boat and the construction of the coupling-joint therein, as hereinafter described. Fig. 5 shows the forward end of the boat and the construction of the coupling-joint therein made to correspond to that part of the said coupling shown at Fig. 4, and hereinafter more fully described.

The nature of my invention and improvements consists in connecting or coupling together two or more boats for navigation on rivers or canals, so that the same shall follow in the rear and line or track of each other, and in the channel made such by means of the forward boat displacing the water by means of the coupling herein described, or by any means substantially the same.

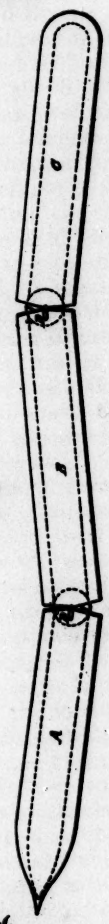
To enable others skilled in the art to make or use my improvements, I will here proceed to describe the construction and operation of the same, which is as follows, to wit:

I construct the respective ends of canal or river boats so that the same may be connected together in long or short lines or trains, as the case may be, by good and sufficient joints or couplings, which shall allow said boats to hinge or turn on center-bolts while passing curves of rivers or canals, and at the same time keep the track or channel made by the first or forward boat, which enables a greater amount of freight, &c., to be carried by the same power with less obstruction and with greater speed than by separate and disconnected boats as is the present case.

The stern end of each section or boat is constructed with a semicircular recess therein. From or near the center of the circumference thereof I construct the angling-bar or stem E, Figs. 3 and 4,

W. Ingalls.
Towing.

No. 45,720. Patented Jan. 3, 1865.



No. 386.
McCreary
v.
Pa. Canal Co.
p. 246

Defendant's Exhibit.
No. 23.

Witnesses.
Franklin Scott
Manus P. Norton

Inventor
W. Ingalls.

which shall extend to the center point of the said circle, which said circle is in full diameter the same as the width of the boat aforesaid and as shown at *m*, Fig. 3. At this center point is the connecting bolt or bar D, which passes into the holes *e* in the strong iron plates *m* and *n*, Fig. 4, and through such holes in corresponding plates, *m'* and *n'*, Fig. 5, by means of which the said boats or sections of the said line or train are firmly connected and held together or detached, as the case may be or require. The respective boats or sections of the said line or train turn or move on this center sufficient to allow the entire line of boats to pass curves in the rivers or canals when in use and without hinderance.

F F, Figs. 3 and 5, show the construction of the bow or forward end of each boat or section of the said line next adjoining, which is so made for the purpose of keeping or preserving the form of the hull of the boat at the said joint or coupling, whereby the channel created by the displacement of the water by the first or forward boat is preserved throughout the entire line or train of boats, so that there is but one displacement of the water, and that by the said first boat, as aforesaid, making thereby a continuous hull for the entire line or train aforesaid, by means of which said boats are more easily moved and controlled in the water, and a larger amount of freight carried, as aforesaid, than in any other way by the same power.

G is the deck, and is so constructed at the ends thereof as to allow the joint or coupling aforesaid to operate when required to do so.

H is a guard-chain, and is placed one on each side of the boat with each end connected to the respective boats in the line or train aforesaid, and which pass said joint or coupling for the purpose of holding each boat from injur*ing* to said joints or couplings when passing curves, as aforesaid.

Upon the said deck may be constructed rooms for freight, or saloons for passengers, or for any other purpose required.

248 This line or train of boats may be drawn or moved by one engine in the first or forward boat, and by a propeller in the rear or last boat, or a propeller may be used in the bow of the first or forward boat, or the whole line or train may be moved by a "steam-tug," so the middle boat may have side wheels to aid in the movement of the said line or train. Any number of boats desired may be used in one line or train, and the same may be connected and disconnected at any time or place required. This line or train of boats is directed in the river or canal by a rudder or rudders placed wherever desired on any of said boats.

Having thus described the construction and operation of my improvements, what I claim, and desire to secure by letters patent of the United States, is—

The connecting or coupling of boats for navigation on rivers or canals into continuous lines or trains by the means or mode substantially as herein described and set forth.

In testimony whereof I have on this 3d day of October, 1862, hereunto set my hand. W. INGALLS.

Witnesses:

MARCUS P. NORTON.

FRANKLIN SCOTT.

249 McCreary
vs.
Penna. Canal Co. } U. S. C. C., E. D. of Penna.

Def'd't's Exhibit No. 24. Sam'l Bell, Sp. Ex'r.

The U. S. Patent Office.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the letters patent granted Stackpole, Spear, and C. & D. Cobb, dated March 6th, 1866, No. 53088, for "improved device for canal propulsion."

In testimony whereof I, R. H. Duell, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto [SEAL.] affixed this sixth day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

R. H. DUELL,
Commissioner.

250 The United States of America to all to whom these letters patent shall come:

Whereas Greenleaf Stackpole, of New York, New York, has alleged that he has invented a new and useful "improved device for canal propulsion" (he having assigned his right, title, and interest in said invention to himself, Nathaniel F. Spear, of Elizabeth, New Jersey, and C. & D. Cobb, of Boston, Massachusetts), which he states has not been known or used before his application; has made oath that he is a citizen of the United States; that he does verily believe that he is the original and first inventor or discoverer of the said invention, and that the same hath not, to the best of his knowledge and belief, been previously known or used; has paid into the Treasury of the United States the sum of thirty-five dollars, and presented a petition to the Commissioner of Patents signifying a desire of obtaining an exclusive property in the said invention, and praying that a patent may be granted for that purpose:

These are therefore to grant, according to law, to the said Stackpole, Spear, and C. & D. Cobb, their heirs, administrators, or assigns, for the term of seventeen years from the twenty-eighth day
251 of February, one thousand eight hundred and sixty-six, the full and exclusive right and liberty of making, constructing, using, and vending to others to be used the said invention, a description whereof is given in the words of the said Greenleaf Stackpole in the schedule hereunto annexed, and is made part of these presents.

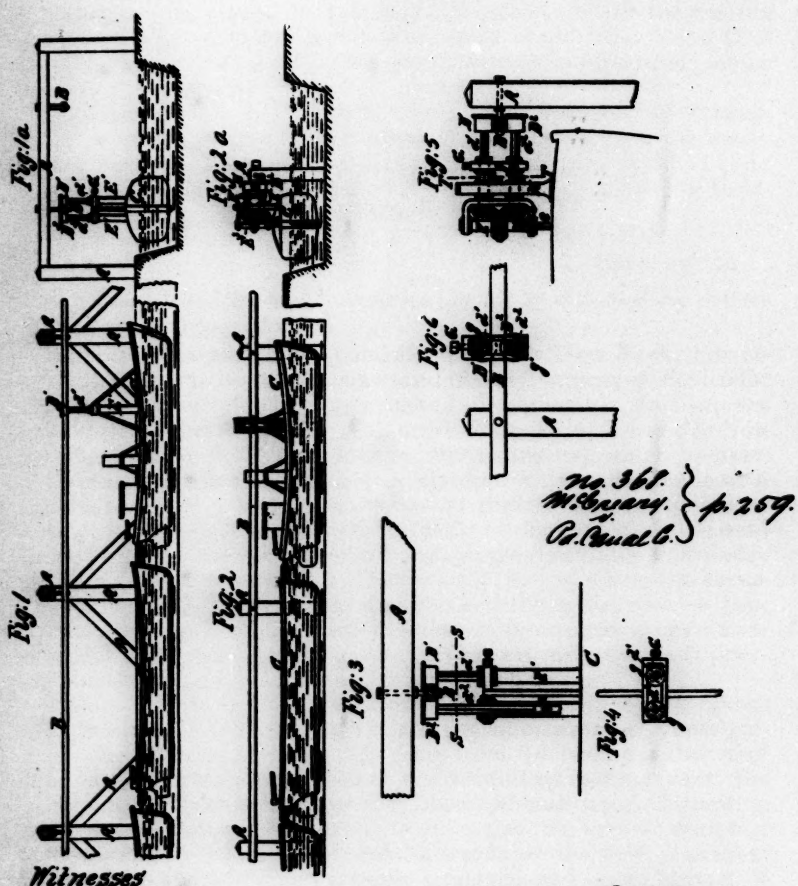
In testimony whereof I have caused these letters to be made patent and the seal of the Patent Office has been hereunto affixed.

[L. S.] Given under my hand, at the city of Washington, this sixth day of March, in the year of our Lord one thousand eight hundred and sixty-six, and of the Independence of the United States of America the ninetieth.

JAS. HARLAN,
Secretary of the Interior.

G. Stackpole,
Towing.

No. 53,088. Patented Mar. 6, 1866.



No. 368.
McCreary.
v.
Pa. Canal Co.
p. 259.

Witnesses
Henry W. Cobbyes
Kimball W. Stetson

Inventor
Greenleaf Stackpole

Countersigned and sealed with the seal of the Patent Office.

T. C. THEAKER,
Commissioner of Patents.

252 *The Schedule Referred to in these Letters Patent and Making Part of the Same.*

To all whom it may concern:

Be it known that I, Greenleaf Stackpole, of the city and county of New York and State of New York, have invented certain new and useful improvements in the propulsion of canal-boats and other vessels. The following is a description of the apparatus in which my invention is involved.

The accompanying drawings form a part of the description.

(Here follows diagram marked p. 259.)

Fig. 1 is a side elevation of a canal-boat containing my invention, and is represented as drawing a train of boats in the canal which is in section.

Fig. 1*a* is an end view of the same.

Fig. 2 is a corresponding elevation with Fig. 1, but shows another form of the invention, and Fig. 2*a* is an end elevation of the same.

Fig. 3 is an enlarged view of a portion of Fig. 1*a*, showing the wheels D^1 D^2 and connected shafts, the sleeve E^2 being partly in section.

Fig. 4 is a cross-section on the line S S in Fig. 3.

Fig. 5 is an enlarged view of that portion of Fig. 2*a* above
253 the deck, showing the wheels D^1 D^2 and connected machinery, the sleeve E^2 being partly in section.

Fig. 6 is a cross-section on the line T T in Fig. 5.

Similar letters of reference indicate corresponding parts in all of the figures.

A A, *et cetera*, are upright posts fixed in the earth. B is a longitudinal rod of timber or other suitable material. I prefer timber plated with iron. This rod is firmly fixed to the posts A, and the several lengths are joined by scarfing or otherwise so as to form a continuous bar or rail of any required length. I propose to make this rail extend the whole length of the canal or along such portion of the canal, river, basin, etc., as shall be required.

C is a boat containing the necessary apparatus for giving a powerful and rapid rotary motion to the propelling wheels. The wheels take hold of the rod B, before described, either by the friction or traction, as it is sometimes termed, of smooth wheels or by the more reliable grasp of gear wheels upon racks extending along on opposite faces of the rail B. D^1 D^2 are the propelling wheels. They are rotated in opposite directions, and are held up to the bar B in the manner described. In Fig. 1 the wheels are horizontal and the rail B is mounted above the boat. In Fig. 2 the wheels are ver-
254 tical and are held to their work against a rail, B, mounted at the side of the canal.

Either plan may be adopted, at pleasure, but they require different modifications of the details. Referring to Fig. 1, d^1 d^2 are

shafts of square section; E^1 E^2 are hollow shafts or sleeves into which the *the* square shafts d^1 d^2 may freely slide.

The shafts E^1 E^2 are geared together or are otherwise connected so as to rotate in opposite directions, and a corresponding rotary motion is thereby imparted to the wheels D^1 D^2, while the latter are free to rise and sink within wide limits by the sliding of the shafts d^1 d^2 within the correspondingly shaped interior of the sleeves E^1 E^2. The wheels D^1 D^2 are provided with stout flanges on their upper edges, which, by resting on the upper edge of the rail B, prevent them from dropping down out of contact with the rail.

The screw G, acting on a box, *g*, or bearing piece, presses together the wheels D^1 D^2 or allows them to separate, as may be required, in adjusting to the width of the rail B or disconnecting the boat from the rail altogether. To effect this latter operation it is necessary simply to separate the wheels and allow them to drop down.

To renew the connection or to connect to a different rail it is necessary simply to bring the boat into position and elevate the
255 wheels D^1 D^2 by sliding the shafts d^1 d^2 longitudinally upward to the proper height and then securing them together. There may be springs of any convenient kind arranged to receive the pressure of the screw G, but in most cases shafts will spring of themselves sufficiently to allow for the trifling variations in the breadth of the rail or the crooks and irregularities of the rail, which will occur under ordinary conditions.

Referring to Fig. 2, the shafts d^1 d^2 and the sleeves E^1 E^2 are mounted horizontally and are geared, not directly together but to a wheel on an upright sleeve, E^3, as represented. This sleeve, together with the yoke or framing represented and the several connected parts, may slide vertically on a shaft, *e*, which is rotated by the engine, not represented. H H are guides which sustain the parts in their proper positions, as will be obvious.

Any variations in the vertical thickness or in the height of the rail B are accommodated by the elasticity of the shafts and by the sliding of the parts vertically within the yoke or guide H. The vertical shaft *e* is square and the interior of the sleeve E^3 is of corresponding form, and the length of the shaft *e* is sufficient to allow the sleeve E^3 and its connections to move vertically many
256 feet, sufficient to accommodate the difference in the plane of flotation when loaded or light and to allow for the varying levels of water on the canal. The upper extremity of the shaft *e* may be sufficiently elevated to stand always above the top of the sleeve E^3, and may be steadied by any convenient frame-work, if desired.

The sliding motion of the shafts d^1 d^2 within their respective sleeves, when mounted horizontally as in Fig. 2, need not be very considerable.

I propose to make it only sufficient to accommodate the slight variations of the rail B from an absolutely straight line and to allow for the movement of the boat due to waves, which is supposed to be slight. To diminish the strain on the parts I propose to employ in

practice a pair of rollers or wheels, not represented, mounted on vertical shafts immediately in front or behind the wheels D^1 D^2.

The shafts of these extra wheels may be connected to the boat as firmly as may be desired.

I can provide each boat with an engine and boiler, or can use one boat so provided, to pull a large number of ordinary boats. I can turn the shafts by the power of men, horses, or other known power, and can in either case adapt the apparatus to work at varying velocities or to work backwards by obvious modifications of the mechanism. I prefer that form of the device in which the shafts are
257 horizontal and the wheels vertical, as indicated in Fig. 2, but I can employ the form shown in Fig. 1 or any mere mechanical modification of either plan, as may be preferred. I propose in some instances to employ a chain or rope in place of the bar or rail B, using by preference the form of chain known as pitch chain, composed of flat plates and rivets put together so as to form links having rectangular holes in which to receive spurs of suitable form projecting from the wheels. This form of chain is familiar in watches and in the feed mechanism of lathes.

I consider the employment of the two wheels D^1 D^2, acting on opposite sides of the bar B, as very important. Where only one is employed every movement of the boat is liable to disconnect the mechanism. If gearing is employed it is liable to involve accidents and delays which might be quite serious, and where the friction or traction alone is relied on it is obviously difficult, if not impossible, to obtain any reliable and uniform amount except by a pressure on opposite sides in the manner provided by my invention. The wheels D^1 D^2 may be flanged on both their edges instead of one edge, if preferred.

Having now fully described my invention, what I claim as
258 new therein and desire to secure by letters patent — as follows:

First. I claim in combination with the bar B, or its equivalent, wheels D^1 D^2 and suitable power within the boat C, the sleeves E^1 E^2, and shafts d^1 d^2, adapted to slide one upon the other, substantially in the manner and for the purpose set forth.

Second. I claim in combination with the sleeves E^1 E^2, shafts d^1 d^2, and wheels D^1 D^2, the transverse sleeve E^3, adapted to slide on the shaft e and allow the wheels D^1 D^2 to yield both vertically and laterally, substantially in the manner and for the purpose herein set forth.

GREENLEAF STACKPOLE.

Witnesses:
HENRY M. COLLYER.
KIMBAL W. STETSON.

Ex'd: M. C. S.

260 McCreary
vs.
Penna. Canal Co. } U. S. C. C., E. D. of Penna.

Def'd't's Exhibit No. 25. Sam'l Bell, Sp. Ex'r.

The U. S. Patent Office.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters patent granted Peter Taylor, dated January 20th, 1846, No. 11044.

In testimony whereof I, R. H. Duell, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto [SEAL.] affixed this fifteenth day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

R. H. DUELL,
Commissioner.

261 A. D. 1846. No. 11044.

Propelling Vessels.

Taylor's specification.

To all to whom these presents shall come I, Peter Taylor, of Hollinwood, near Manchester, machinist, send Greeting:

Whereas her present most excellent majesty Queen Victoria, by her royal letters patent, under the great seal of Great Britain, bearing date, at Westminster, the twentieth day of January, in the ninth year of her reign, did, for herself, her heirs and successors, give and grant unto me, the said Peter Taylor, my ex'ors, adm'ors, and assigns, her especial license, full power, sole privilege and authority that I, the said Peter Taylor, my ex'ors, adm'ors, and assigns, or such others as I, the said Peter Taylor, my ex'ors, adm'ors, or assigns, should at any time agree with, and no others, from time to time and at all times during the term of years therein expressed, should and lawfully might make, use, exercise, and vend within England, Wales, and the town of Berwick-upon-Tweed my invention of "certain improvements in machinery for propelling
262 vessels, carriages, and machinery, parts of which improvements are applicable to drawing and propelling fluids, also improvements in the construction of vessels;" in which said letters patent is contained a proviso that I, the said Peter Taylor, shall cause a particular description of the nature of my said invention and in what manner the same is to be performed to be enrolled in her said majesty's high court of chancery within six calendar months next and immediately after the date of the said in part recited letters patent, as in and by the same, reference being thereunto had, will more fully and at large appear:

Now, know ye that in compliance with the said proviso I, the said

Peter Taylor, do hereby declare that the nature of my said invention and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed and to the figures and letters marked thereon—that is to say:

My invention relates first and principally to certain combinations, including new arrangements, both of vessels and of machinery and apparatus for propelling vessels, whereby I am enabled to
263 get rid of the resistance, and consequently to obtain a much higher velocity, with less expenditure of power, than heretofore; and here I may premise that my invention is principally based upon the following general propositions, which I hold to be paramount: first, it is necessary to do away as much as possible with resistance; secondly, that the dimensions — the vessels carrying the steam power should be as narrow as may be for receiving the power required, and to draw as little water as possible; thirdly, in order to attain the highest velocity, the vessels employed must be upon rather than in the water; fourthly, that it is important to bring up inland navigation to compete with railways in speed and convenience to the public; fifthly, that for canals extreme lightness and narrowness (as compared with boats of ordinary construction) rather than excessive power is a principal desideratum; sixthly, that in order to the combining extreme lightness with great strength it will be obvious that for inland steam navigation long, narrow boats, with boilers of greatly extended length, but proportionably reduced diameter, — affixed and placed so as to form a sort of backbone for each by being placed down upon the bottom of and extending considerably along the boat.

My second improvement refers to rotary steam-engines
264 which are suitable for driving such machinery and for propelling vessels, and also for propelling the wheels of locomotive engines, and generally to actuating machinery; also to the drawing and propelling of fluids; and, thirdly, to improvements in the construction and arrangement and modes of connecting vessels when worked in trains, whether for canal, river, or ocean navigation; and, fourthly, to improvements in the construction of vessels. But in order that my invention may be fully understood, I will proceed to describe the drawings hereunto annexed.

Description of the Drawings.

(Here follow diagrams marked pp. 275 to 283, incl.)

Figures 1, 2, and 3, sheet 1, show a longitudinal section, a plan, and a cross-section of a boat with parts arranged according to my invention. *a a* is the framing of the boat, which is of the ordinary construction, except at the stern, where the sides are extended at a^1 beyond the stern a^2 in order to carry the propellers as shown; and it will be seen that between the parts a^2 and a^3, where the rudder post is shown carrying the rudder, the bottom is removed in order that the propeller may more readily act on the water, the sides and rudder post being sustained at their ends by the frames a^4, the rudder

post being stead-ed at its lower end by an extension of the keel. In some cases, however, I remove this part of the keel between the parts a^2 and a^3 and support the lower end of the rudder post
265 by suitable stays from the side framing. b b is the propeller frame, which is capable of being adjusted to different angles of inclination, b^1 b^1 being axes upon which the frame b turns and b^2 b^2 being chains which are each connected to the frame b as shown and pass over the pulleys b^3 b^3 to the windlass b^4, which is turned by means of handles, in the usual way, so as to raise the outer end of the frame b to any angle which may be found most effectual in propelling the boat. c c are the propeller shafts, which turn in bearings c^1 c^1 in the frame b (which is shown on a larger scale in sheet 2). c^2 c^2 are the propellers fixed thereon. These propellers, it will be seen, are shorter in their radial length as they recede from the body of the boat, and may thus be said to form parts of a cone; but I do not confine myself to this arrangement, the object being that, in working, each paddle may be equally acting upon the surface of the water, which at that part becomes thrown upwards into an inclined direction, as shown by the drawings. c^3 c^3 are bevelled pinions on the ends of the shafts c. These bevelled pinions c^3 are geared into and receive motion from the bevelled wheels d d, on the shaft d^1, which has motion given to it by rods from the cylinders e e in the ordinary manner. f f is the boiler, which, it will be seen, is arranged with fire-boxes g in the centre, each fire-box being separated from the other by a
266 portion of the boiler, as shown at h. i is the fire-grate (which in one fire-box is shown removed). j are the fire-doors. k are fire-bridges, formed of parts of the boiler. The flame and heated particles pass from each fire-box through a series of tubes, l l, to the smoke-boxes m, as is now commonly the case with locomotive engines and some other boilers. n n are the chimneys. o is the steam dome or chamber. And I would here remark that I have only thought it necessary to show the general arrangement of the boiler, and I have omitted to show the steam-pipes, as the arrangement of them which I make use of being of the ordinary kind and forming no part of my invention, its being shown would only have tended to make the drawing complex. The boiler, it will be seen, is carried upon rollers f^1 f^1, which run upon the rails a, such rails forming parts of the main framing of the boat; but in some cases I should apply V-pieces instead of the rollers f^1, sliding on V-guides, and in order that the sliding of the boiler on such rails in the boat may be readily effected I apply strong screw axles, q, which are turned by a suitable instrument passing through the holes in the head q^1 in the manner of screw-jacks. The object of having such adjusting means is to
267 provide against the boats being heavier and consequently drawing more water at one end than at the other, according to the speed at which the vessel is travelling, or otherwise to adjust the weight to circumstances, so as to obtain the trim desired.

The drawing, sheet 3, shows on an enlarged scale a modification of the frame b, the only difference being in the mode of arranging the shaft c, which, it will be seen, in this case approach nearer to

each other as they recede from the body of the boat; but as it will be evident that any slight variation of that kind may readily be made to contract and cause the same to diverge, I have only thought it necessary to show one modification. Figure 4, sheet 1, shows part of the bow of one of such boats such as are shown at figures 1 and 2, sheet 1, with apparatus applied to cut away and remove ice, in the manner of a plough, by the passage of the vessel through the water. Figures 1 and 2, sheet 4, shew a longitudinal section and a plan of another boat, the only material difference being in the arrangement of the boiler, which in this case, it will be seen, has its fire-boxes or furnaces at each end, and I have made use of the same letters of reference to indicate similar parts. The flame and heated particles pass from each fire-box through tubes to a central smoke-box and chimney. *o o* are the steam domes or chambers. *v v* are the steam-pipes to convey the steam to the engines, and in order to allow of
268 the sliding motion which may be given to the boiler I construct the steam-pipes at r^1, so that one part may slide within the other, those parts being suitably packed so as to be steam-tight — is well understood; or, instead of having a joint in the steam-pipes I affix the cylinders to the boiler carriage and form the connecting rods from the piston-rods to the cranks of the shaft *d* so as to be adjustable to the variable distance of the boiler from the axle *d*.

I will now proceed to describe the second part of my invention, which relates to improvements in rotary steam-engines and engines for drawing and propelling fluids, the peculiarity of which consists in so combining two revolving drums, with teeth and recesses (the teeth in one drum working into corresponding recesses in the other drum), that the steam, when such engine is being used as a steam-engine, may more readily act on such teeth to cause the drums to revolve.

In drawing, sheet 5, figure 1 shows an external side view, figure 2 a side view in section, figure 3 a plan, figure 4 a section through the lines A B in figure 2, and figure 5 a section through the lines C D of figure 2. *a a* is the casing of the engine, in which revolve the drums *b b*, each drum having a series of teeth, b^1, leaving recesses b^2 between such teeth, by which the two drums are
269 caused to revolve together, and in addition to the teeth and recesses b^1 b^2 there are other teeth, b^3, which are to be packed on their outer surface so as to form a close joint with the casing. These teeth b^3 in the revolution of the drums *b* pass into the recesses b^4. And I would here remark that I am aware that it has before been proposed to construct rotary engines with two drums, each having teeth and recesses, the teeth of one drum passing the recesses in the other; but in such case the steam was directed on the tooth wheel for the time being was between the two drums, so that the drums were caused to revolve towards each other. Now, I consider it important that the steam should be directed to act with its full force against the sides of the teeth, so as to cause the drums to revolve from each other as indicated by the arrows, for which purpose I construct the steam passages *c c*, as well as the outlet passages *d d*, as near as may be, on a line drawn between the internal peripheries

of the two parts of the case as shown. *e f* are pipes communicating with the valve-box *g*, containing the valve *h*, for the purpose of reversing the engine when necessary by causing the passages *d d* for the time being to be those through which the steam passes to the drums. *i* is the inlet pipe for the steam, and *j* is the outlet pipe. *k* shows packing applied to the various parts. Figure 6 shows a modi-
270 fication of the above arrangement, in which only two teeth and two corresponding recesses are used to each drum; and figure 7 shews a section of another modification in which the teeth b^1 and corresponding recesses b^2 only are used without the teeth b^3 and recesses b^4, as described with respect to figures 1 to 5. When it is intended to use these arrangements of engines for the purpose of drawing and propelling fluids it will only be necessary to apply the left pipe to the end of the passages *d d* and the force or supply pipe to the passages *c c*. I would here remark that I consider the above arrangement of rotary steam-engine peculiarly applicable to those vessels which are propelled by propellers placed on two separate shafts, similar to those above described.

I will now proceed to describe the third part of my invention, which is shewn in sheet 6, and which consists of combining a number of boats together in the form of a train, similar to what is now practised with respect to carriages on railways.

Figures 1 and 2 show in plan and side view a series of boats of a lighter kind and intended to carry passengers. The boat A carries the boiler (which in this case is similar to the long boiler of
271 locomotives) and engines; the boat B serves as a tender to carry the fuel, while the boats C D E carry passengers. Figures 3 and 4, shown in plan and side view, a similar arrangement of boats. The engines, in this case, in the boat A are shown to be of the rotary kind; the axes are shown at once to give motion to the axes of the propellers, and figures 5 and 6, shown in plan and side view, another series of boats intended to carry heavy goods, and in this case the boat A is shown to have a double boiler, similar to those shown in the first part of my invention, and in loading the boats I prefer that each boat in the rear should draw less water than the preceding. In each case I propose to connect the boats by means of the connecting parts shown in drawing, sheet 7, where it will be seen that the end of one boat is provided with a stem *z*, which is received into a socket, *y*, in the next boat in such manner that the parts not only serve to connect the boats together, but also that one boat may be capable of aiding to support the preceding one. The socket *y* has a stem to it, which has a male screw formed thereon which passes through the boss of the wheel *x*, and the wheel *x* has motion given to it by means of a pinion, *w*, on the axle w^1. *v* is the framing for supporting the parts *x*, *y*, and w^1.

272 I will now proceed to describe the fourth part of my invention, which is shewn in sheet 8, and which consists in constructing vessels so as to be especially adapted to passing through heavy seas without the liability of being filled by the waves. Figure 1 shows a side view, and figure 2 a section. The upper part *a* is formed with stout glass, so as to admit light. *b* is the funnel and

c c are pipes rising considerably above the surface of the vessel; these pipes are for the purpose of admitting air to the interior and conducting off foul air. *d* is the rudder, which in fine weather may be worked from the platform *e*, through which entrance is obtained to the vessel; at other times the rudder is operated upon by lines passing through stuffing boxes *f*. *g* is part of a shaft, to which suitable propellers may be attached. Sheet 9 shows several views of a vessel for sea service, in which the propellers are placed in the midships.

Having thus described the nature of my said invention and the manner of performing the same, I would have it understood that I do not confine myself to the various details shown and described, so long as the peculiar feature of either part of my invention be retained; but what I do claim is—

First, the mode of arranging propellers so that they may form a portion of a cone and be made of portions of a screw, whether
273 the axles be arranged parallel to each other, as shown, or otherwise.

Secondly, I also claim the placing the propeller frame on axes so as to adjust at pleasure the depth at which the propeller shall work, and this arrangement of fan is applicable where one or more propeller shafts are used; and also, I claim the adjusting the trim of the vessel by moving the boiler or boilers and engines on suitable rails or ways formed in the boat, as herein described. I also claim the applying an ice-plough steam-propelled boat for inland waters, as herein described. I claim also the mode of constructing rotary engines as herein described, whether such engines be used for the purpose of steam or for drawing and propelling fluids.

Thirdly, I claim the so connecting a series of boats into a train that the after boats may receive or have transferred to them some of the weight of the preceeding boats.

And, fourthly, I claim the mode of constructing sea-going vessels so that the same are capable of passing through the waves, as herein described.

In witness whereof I, the said Peter Taylor, have hereunto set my hand and seal this twentieth day of July, one thousand eight hundred and forty-six.

PETER (L. S.) TAYLOR.

274 And be it remembered that on the twentieth day of July, in the year of our Lord 1846, the aforesaid Peter Taylor came before our said lady, the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified, in form above written; and also the specification aforesaid was stamped according to the tenor of the statute made for that purpose.

Enrolled the twentieth day of July, in the year of our Lord one thousand eight hundred and forty-six.

Ex'd: C. C. W.

of the two parts of the case as shown. *e f* are pipes communicating with the valve-box *g*, containing the valve *h*, for the purpose of reversing the engine when necessary by causing the passages *d d* for the time being to be those through which the steam passes to the drums. *i* is the inlet pipe for the steam, and *j* is the outlet pipe. *k* shows packing applied to the various parts. Figure 6 shows a modi-
270 fication of the above arrangement, in which only two teeth and two corresponding recesses are used to each drum; and figure 7 shews a section of another modification in which the teeth b^1 and corresponding recesses b^2 only are used without the teeth b^3 and recesses b^4, as described with respect to figures 1 to 5. When it is intended to use these arrangements of engines for the purpose of drawing and propelling fluids it will only be necessary to apply the left pipe to the end of the passages *d d* and the force or supply pipe to the passages *c c*. I would here remark that I consider the above arrangement of rotary steam-engine peculiarly applicable to those vessels which are propelled by propellers placed on two separate shafts, similar to those above described.

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272 I will now proceed to describe the fourth part of my invention, which is shewn in sheet 8, and which consists in constructing vessels so as to be especially adapted to passing through heavy seas without the liability of being filled by the waves. Figure 1 shows a side view, and figure 2 a section. The upper part *a* is formed with stout glass, so as to admit light. *b* is the funnel and

c c are pipes rising considerably above the surface of the vessel; these pipes are for the purpose of admitting air to the interior and conducting off foul air. *d* is the rudder, which in fine weather may be worked from the platform *e*, through which entrance is obtained to the vessel; at other times the rudder is operated upon by lines passing through stuffing boxes *f*. *g* is part of a shaft, to which suitable propellers may be attached. Sheet 9 shows several views of a vessel for sea service, in which the propellers are placed in the midships.

Having thus described the nature of my said invention and the manner of performing the same, I would have it understood that I do not confine myself to the various details shown and described, so long as the peculiar feature of either part of my invention be retained; but what I do claim is—

First, the mode of arranging propellers so that they may form a portion of a cone and be made of portions of a screw, whether
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Thirdly, I claim the so connecting a series of boats into a train that the after boats may receive or have transferred to them some of the weight of the preceeding boats.

And, fourthly, I claim the mode of constructing sea-going vessels so that the same are capable of passing through the waves, as herein described.

In witness whereof I, the said Peter Taylor, have hereunto set my hand and seal this twentieth day of July, one thousand eight hundred and forty-six.

PETER (L. S.) TAYLOR.

274 And be it remembered that on the twentieth day of July, in the year of our Lord 1846, the aforesaid Peter Taylor came before our said lady, the Queen, in her chancery, and acknowledged the specification aforesaid, and all and everything therein contained and specified, in form above written; and also the specification aforesaid was stamped according to the tenor of the statute made for that purpose.

Enrolled the twentieth day of July, in the year of our Lord one thousand eight hundred and forty-six.

Ex'd: C. C. W.

284 McCreary
v.
Penna. Canal Co. } U. S. C. C., E. D. of Pa.

Def'd't's Exhibit No. 26. Samuel Bell, Sp. Ex.

The U. S. Patent Office.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the bound volume of the library of this office of the specification and drawing in the matter of English letters patent granted John Bourne, dated June 26th, 1857, No. 1795.

In testimony whereof—, R. H. Duell, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed
[seal.] this fifteenth day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

R. H. DUELL,
Commissioner.

285 [British coat of arms.]

A. D. 1857. No. 1795.

Steam Train for Navigating Shallow Rivers.

Letters patent to John Bourne, of No. 9 Billiter street, in the city of London, civil engineer, for the invention of "an improved steam train for navigating shallow rivers."

Sealed the 29th October, 1857, and dated the 26th June, 1857.

Complete specification filed by the said John Bourne at the office of the commissioners of patents, with his petition and declaration, on the 26th June, 1857, pursuant to the 9th section of the patent law amendment act, 1852.

To all to whom these presents shall come I, John Bourne, of No. 9 Billiter street, in the city of London, civil engineer, send greeting:

Whereas I am in possession of an invention for "an improved steam train for navigating shallow rivers," and have petitioned her majesty to grant unto me, my executors, administrators, and assigns, her royal letters patent for the same, and have made solemn declaration that I verily believe myself to be the first and true inventor thereof:

Now, know ye that I, the said John Bourne, do hereby declare that the following complete specification, under my hand and seal, fully describes the nature of my said invention and the manner in which the same is to be performed (that is to say):

The train by which I accomplish the navigation of shallow rivers is composed of a steamer and train of barges, articulated to
286 one another by circular joints, so as to admit of lateral and vertical deflection. The different constituent vessels of the train

are made with their ends either concave or convex, and each convex end fits into a corresponding concave end, without leaving any considerable space between them, so that the train is virtually a very long-jointed vessel, of which I prefer that the steamer should constitute the first compartment. Each convex end has, at the central point from which the convexity is swept, a strong pin, from which two rods or stays proceed to the outer edges of the contiguous concave ends, and these rods always keep the constituent barges of the train at the right distance apart and prevent them either from touching one another or from having too great a space between them. The train may be steered either by rudders at the bow and stern or by employing two separate engines to work two paddle-wheels not connected with one another, so that one wheel may be turn- ahead and the other astern; but the mode of steering or guiding the train which I prefer to employ consists in an arrangement whereby the first and *large* barges of the train may be moved in any desired angle with the body of the train by means of suitable mechanism applied for that purpose, and the nature of the course which the train will pursue will depend upon the direction and amount of the deflection given to the terminal barges. I also, in some cases, employ suitable deflecting apparatus between each of the barges of the train, so as to throw them into a curve or circle, the action, in fact, resembling that which the muscles exert upon the vertebræ of a fish or other animal; and by this action the train is constrained to pursue the direction of the curve into which it is thrown.

In order to assist the train over sand banks or other shallows in the rivers it navigates I cause the paddle-wheels to project somewhat below the bottom of the steamer, so that they will be the first part to take the ground; and in case the ordinary power of the engine is insufficient to draw the train over I apply multiplying gearing to the paddle-wheels, which gearing, when thrown into action, will turn the paddle-wheels round with a slow motion, but with so much force as will suffice to draw the steamer over the bank, even although there is no water upon it at all, and if the steamer gets over she can draw over the succeeding barges one at a time by disconnecting them from one another and by drawing up each in succession by an appropriate rope proceeding from the steamer. In some cases I accomplish the propulsion of the steamer by means of jets of water, set in motion by horizontal revolving arms or blades, like those of a centrifugal fan, set in a suitable water-tight case in the bottom of the vessel, and this instrument, which is larger in diameter than the breadth of the vessel, sucks in the sand and
287 water at its central part and discharges them at its circumferential part through an opening or openings pointing astern, thus clearing away the sand from beneath the bottom and at the same time propelling the vessel. In other cases I propel the steamer by means of a single paddle-wheel at the bow instead of the usual paddle-wheels at the sides, and this wheel, by projecting below the bottom, clears a passage for the vessel by removing the sand. In other cases I apply two screws, revolving in opposite directions, in

the bow of the steamer. These screws, which are of large diameter and only partially covered by the water, project somewhat below the bottom of the steamer, and they sweep away to each side the sand or other impediment which may be in the steamer's track and clear a course for her, so that she will run in the channel which she has just cut. The train may thus be impelled either by paddle-wheels at the sides or at the bow, by screws turning in opposite directions in the bow, or by an instrument resembling a revolving fan or centrifugal pump in the bottom; and any proportion or combination of these methods may be employed simultaneously for propulsion, for aiding the progress of the train over the shallows.

The whole of the vessels or barges constituting the train I prefer to build of iron, and when so built I truss the steamer by means of iron pipes rising up above the deck from the bow to the vicinity of the paddle-boxes and descending from thence to the stern. I also place on each side of the steamer, near the stern, a rudder, which usually lies inoperative against the ship's side; but should the steamer require to be detached from the train and proceed by herself these rudders will then come into action.

To prevent the train from turning round in descending a rapid river, should the steamer or first barge happen to get aground, I apply a mast or pole in the last barge, which can be immediately dropped through a tube passing from the deck through the vessel's bottom, and this pole, by engaging the bottom of the river, anchors the stern of the train and prevents it from being swung round by the current; and when the steamer is again ready to advance the pole can be drawn up by means of a rack, screw, or other usual arrangement for such a purpose, or in like manner the mast may be sunk into the ground by the weight of the last barge being thrown upon it. To enable the different constituent barges of the train to be steered in unison I apply in the first barge a large hand, moving upon an arc or dial set in a conspicuous position, so as to be visible from all the succeeding barges, — the amount of deflection they ought to observe and the track they ought to pursue. To enable the train to ply by night a powerful light-house is place- in the bow, formed either with a number of concentric wicks with oil or formed to burn naphtha vapour on the principle of a blast furnace, a current
288 of air being driven up through the naphtha vapour, either by means of a centrifugal fan or otherwise, so as to compel a vivid combustion. To prevent the sandy or muddy water of the rivers from destroying the boilers the feed-water is first filtered by passing it through filter bags, like those commonly employed in sugar refineries.

Having now described generally the nature of my invention and the manner of its application and use, I will proceed to illustrate it in further detail by the aid of the accompanying three sheets of drawings.

(Here follow diagrams marked pp. 292 to 294, incl.)

Sheet 1 gives a general view of the arrangement and articulation of the train, Fig. 1 being an elevation and Fig. 2 a ground plan of

it. This train consists of a steamer and five barges; but the number of the barges may be increased or diminished, as occasion requires, and the train on its voyage will often unhook one barge and hook on another, so as to prevent delays in the transfer of cargo. The barges are connected to the steamer and to one another by means of the rods A B A B turning upon the centre A, from which point the ends of the barges are swept, so that the same distance is always maintained between the barges, at whatever angle with one another they may be set.

In sheet II the steamer is represented on a larger scale and in greater detail. Fig. 1 is a longitudinal section of the steamer, and Fig. 2 a ground plan. Fig. 3 is a transverse section through the paddle-boxes, and Fig. 4 is a transverse section at the end of the boilers. The same letters refer to the same parts in all the figures.

A is the point of traction, and A B A B are the two draw-bars by which the steamer is connected to the barges behind her. The attachments of the draw-bars at A and B B consist of strong pins or spindles projecting above the deck of the steamer at A and the deck of the barge at B B. The deflecting apparatus consists of an ordinary steering wheel and chain barrel, upon which the chain C C is wound in the usual manner, and this chain passes over pulleys at E E attached to the barge and pulleys at D attached to the steamer, while the ends of the chain are attached to the barge at the points B B. It follows from this arrangement that when a strain is put upon the chain the points D and E approach one another, either upon one side or the other, depending on the direction in which the steering wheel is turned, and the steamer is thus set at any desired angle with the train, whereby the direction which she pursues through the water is correspondingly affected. The same species of apparatus is employed to deflect the last barge of the train, and also all or any of the intermediate barges; and this apparatus may be exchanged for any equivalent deflecting apparatus producing a similar result. M is a check-chain to prevent the steamer
289 from being angled so far as to cause the points E E of the barge to jam against the sides of the steamer, and to obviate this result the ends of all the barges must always be less than a semicircle. It is quite immaterial whether the stern of the steamer is made concave or convex, and it is also immaterial whether the barges are made alternately with two convex ends and two concave ends or whether there is one concave and one convex end to each, the only material point being that the articulation should be such as to enable the train to bend in any required direction without any considerable space being left between its constituent barges. F F are the paddle-wheels; G G, the cylinders; H H H, the boilers, and P P P, the truss-work of pipes for giving longitudinal and transverse strength to the vessel. These pipes I prefer should be rolled wrought-iron pipes, with malleable iron flanges rivetted upon them, which flanges are to be truly faced and bolted together; but the short cross-pieces at the points of junction of the longitudinal and transverse pipes may be of cast iron for facility of construction.

Figures 1 and 2, sheet III, exhibit the arrangements whereby a

centrifugal propeller, worked on the principle of a revolving fan, is applied to the steam vessel or leading barge of the train; and the same letters refer to the same parts in both figures.

A is the steam cylinder; B, a vertical revolving shaft upon which the crank of the engine is fixed; and C C, the revolving arms of the fan, which may be six in number, and which are shewn in dotted lines upon Fig. 2. These arms are studded on the lower sides with spikes projecting below the bottom of the ship, or are tied together with rods carrying spikes. The case in which the centrifugal propeller revolves is water-tight at every part, except where the spikes project through the bottom. The spikes stir up the sand, and the sand and water are drawn through the open part of the casing by the centrifugal action of the propeller, and are discharged through the nozzles D D at the side of the vessel.

Figs. 3 and 4, sheet III, exhibit the arrangements whereby the steam vessel or first barge of the train is propelled by a single paddle-wheel in the bow, instead of by two paddle-wheels at the sides, as is the usual practice when vessels are propelled by paddle-wheels; the same letters refer to the same parts in both figures.

A A are the cylinders; B B B, the boilers; and P P, the paddle-wheel situated in the bow, and which is made so as to project several inches below the bottom of the vessel, in order that the paddle floats may scoop up the sand when the vessel comes to shallow water, and thus cut a channel for the vessel to pass through.

290 Figs. 5, 6, and 7, sheet III, exhibit the arrangements under which the steamer or first barge of the train is propelled by means of screws or vane wheels revolving in opposite directions at the bow, those screws or vane wheels being only partially immersed in the water, and being so set that the lower edges of the arms or blades project below the bottom of the vessel.

A A are the cylinders of the engines and S S the screws, and the same letters refer to the same parts in all the figures. The blades of the screws or vane wheels may be planes set obliquely to the revolving shafts, or they may be spiral or of any other form, the form not being material in any degree; but they must project into the water sufficiently not only to obtain adequate propelling surface to drive the vessel in an efficient manner, but also to stir up the sand of the bottom of the river when the vessel gets into shallow water, and thus clear a channel that the vessel may pass easily through.

Having now fully described the nature of my invention, I have only to add that I claim as of my invention the combination into an articulated or jointed train, in the manner described, of a steamer and one or more barges, the articulation being of the nature of a ball-and-socket joint, so as to permit both lateral and vertical deflection.

I also claim as of my invention the steering or guiding of such a train by accomplishing, by means of any suitable apparatus, the deflection of all or any of the barges.

I also claim the use of a mast or pile descending through the last barge to anchor the stern of the train.

I also claim the use of an index in the first barge to point out to all the succeeding barges the right course to steer.

I also claim the use of a powerful light-house at the bow, with appropriate lenses and reflectors, to enable the train to proceed by night.

I also claim as of my invention the mode of helping a vessel over the shallows, by causing the paddle-wheels to engage the bottom of the river, and then moving them round by means of appropriate gearing with great force, thus constituting a revolving anchor with great area of fluke.

I also claim as of my invention the mode of propelling by means of a centrifugal apparatus in the bottom, sending out streams of water at the sides, such apparatus being so formed as to stir up the sand of the bottom of the river and suck it up out of the vessel's course.

I also claim as of my invention the mode of propelling by means of a paddle-wheel in the bow, which wheel, by stirring up the sand when the vessel comes into shallow water, cuts a passage for her, so that grounding becomes impossible.

291 I also claim as of my invention the application of two screws or vane wheels revolving in opposite directions at the bow, and projecting below the bottom sufficiently to open a channel for the vessel when she gets into shallow water, by scooping up the sand and casting it to each side.

I also claim as of my invention the mode described of trussing vessels by means of metallic pipes, whereby great strength with great lightness are insured.

In witness whereof I, the said John Bourne, have hereunto set my hand and seal this twenty-sixth day of June, in the year of our Lord one thousand eight hundred and fifty-seven.

JOHN BOURNE. [L. S.]

London. Printed by George Edward Eyre and William Spottiswoode, printers to the Queen's most excellent majesty. 1857.

295 McCREARY *vs.* PENNA. CANAL CO. } U. S. C. C., E. D. of Penna.

DEF'D'T'S EXHIBIT No. 27. Samuel Bell, Sp'l Ex.

The U. S. Patent Office.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the bound volume of the library of this office of the specification and drawing in the matter of English letters patent granted William Hamond Bartholomew, dated February 7th, 1862, No. 330, for imp't in barges or vessels suitable for the navigation of canals and rivers.

In testimony whereof I, R. H. Duell, Commissioner of Patents,

have caused the seal of the Patent Office to be hereunto
[SEAL.] affixed this eleventh day of April, in the year of our Lord one thousand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

R. H. DUELL,
Commissioner.

296 [British coat of arms.]

A. D. 1862, 7th February. No. 330.

Barges.

Letters patent to William Hamond Bartholomew, of 2 Warwick Villas, Leeds, in the county of York, for the invention of "improvements in barges or vessels suitable for the navigation of canals and rivers."

Sealed the 29th July, 1862, and dated the 7th February, 1862.

Provisional specification left by the said William Hamond Bartholomew at the office of the Commisioner of Patents, with his petition, on the 7th February, 1862.

I, William Hamond Bartholomew, of 2 Warwick Villas, Leeds, in the county of York, do hereby declare the nature of the invention for "improvements in barges or vessels suitable for the navigation of canals and rivers" to be as follows:

This invention has for its object improvements in barges or vessels suitable for the navigation of canals and rivers. For this purpose I so construct barges or vessels that they may be coupled together end to end, so as to form a compound vessel of any desired length. Each of the barges to be employed as an intermediate section or compartment of such a compound vessel is made nearly rectangular in plan, but somewhat convex both at stem and stern. In the centre of the stem of each such barge a protection somewhat similar to the cut-water of an ordinary vessel is formed. This cut-water, when several barges are coupled up into a compound vessel, enters a corresponding recess in the stern of the barge in front
297 of it. The couplings may be of any convenient construction, and should keep the compartments constantly in contact the one with the other. They are applied at the centre of the vessel, so as not to prevent the barges swinging laterally, as far as the convexity of their ends will admit. In these motions the projections or cut-waters at the front of the barges are still held by the couplings in the recesses in the stems of the barges in front of them, so that the barges are, as it were, jointed together. The barge to be used as the leading compartment of the compound vessel is tapered in front, so as to be resisted as little as possible by the water in passing through it, and, similarly, the barge to be used as the stern compartment of the compound vessel is so formed as to suit it for this position, and is fitted with a rudder. The steering of the compound vessel is, however, to a great extent, effected by chains or other con-

nections, which pass along each side of the compound vessel from stem to stern. They are each attached at one end to one of the terminal barges, and at the other they are passed round a capstan or windlass at the other extremity of the compound vessel, and the chains or connections are passed through suitable guides on each of the intermediate barges. By turning the capstan or windlass the chain on one side of the compound vessel (supposing a chain to be employed) is wound up, and the chain on the other side is slacked out to a corresponding extent, and thus the compound vessel is drawn into a curved form, each barge pivoting about its projecting cut-water. The capstan or windlass may, if desired, be mounted in a central compartment. The barges are, by preference, constructed of iron, and they are each furnished with a water-tight door or doors at the inside or bottom, so that when the barges have arrived at their destination and are disconnected they may each be lifted bodily out of the water, the door or doors opened, and the cargo discharged through it or them. In a similar manner the barges may be loaded. The barge (by preference one of the terminal ones) may, if desired, be fitted with propelling apparatus.

Specification in pursuance of the conditions of the letters patent filed by the said William Hamond Bartholomew in the Great Seal Patent Office on the 7th August, 1862.

To all to whom these presents shall come I, William Hamond Bartholomew, of 2 Warwick Villas, Leeds, in the county of York, send greeting:

298 Whereas her most excellent majesty, Queen Victoria, by her letters patent bearing date the seventh day of February, in the year of our Lord one thousand eight hundred and sixty-two, in the twenty-fifth year of her reign, did, for herself, her heirs and successors, give and grant unto me, the said William Hamond Bartholomew, her special licence that I, the said William Hamond Bartholomew, my executors, administrators, and assigns, or such others as I, the said William Hamond Bartholomew, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man an invention for "improvements in barges or vessels suitable for the navigation of canals and rivers," upon the condition (amongst others) that I, the said William Hamond Bartholomew, my executors or administrators, by an instrument in writing under my or their or one of their hands and seals, should particularly describe and ascertain the nature of the said invention and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said letters patent:

Now, know ye that I, the said William Hamond Bartholomew, do hereby declare the nature of the said invention and in what manner

the same is to be performed to be particularly described and ascertained in and by the following statement thereof—that is to say:

This invention has for its object improvements in barges or vessels suitable for the navigation of canals and rivers. For this purpose I so construct barges that they may be coupled together end to end, so as to form a compound vessel of any desired length. Each of the barges to be employed as an intermediate section or compartment of such a compound vessel is made nearly rectangular in plan, but somewhat convex both at stem and stern. In the centre of the stem of each such barge a projection somewhat similar to the cut-water of an ordinary vessel is formed. This cut-water, when several barges are coupled up into a compound vessel, enters a corresponding recess in the stern of the barge in front of it. The couplings may be of any convenient construction and should keep the compartments constantly in contact the one with the other. They are applied at the centre of the vessel, so as not to prevent the barges swinging laterally as far as the convexity of their ends will admit. In these motions the projections or cut-
299 waters at the front of the barges are still held by the couplings in the recesses in the sterns of the barges in front of them, so that the barges are, as it were, jointed together. The barge to be used as the leading compartment of the compound vessel is tapered in front, so as to be resisted as little as possible by the water in passing through it, and, similarly, the barge to be used as the stern compartment of the compound vessel is so formed as to suit it for this position, and is fitted with a rudder. The steering of the compound vessel is, however, to a great extent effected by chains or other connections, which pass along each side of the compound vessel from stem to stern. They are each attached at one end to one of the terminal barges, and at the other they are passed round a capstan or windlass at the other extremity of the compound vessel, and the chains or connections are passed through suitable guides on each of the intermediate barges. By turning the capstan or windlass the chain on one side of the compound vessel (supposing a chain to be employed) is wound up, and the chain on the other side is slacked out to a corresponding extent, and thus the compound vessel is drawn into a curved form, each barge pivoting about its projecting cut-water. The capstan or windlass may, if desired, be mounted in a central compartment. The barges are, by preference, constructed of iron, and they are each furnished with a water-tight door or doors at the end, side, or bottom, so that when the barges have arrived at their destination and are disconnected they may each be lifted bodily out of the water, the door or doors opened, and the cargo discharged through it or them. In a similar manner the barges may be loaded. The barges (by preference one of the terminal ones) may, if desired, be fitted with propelling apparatus.

Having thus stated the nature of my invention, I will proceed more fully to describe the manner of performing the same:

Description of the Drawings.

Figure 1 represents a plan view, and Fig. 2 represents a side elevation, partly in section, of a compound vessel constructed and combined according to my invention, consisting of eight barges or vessels, A, B, B, B, B, B, B, and C. These barges or vessels are free to move about on their projections *a*, *a*, *a*, *a*, *a*, *a*, *a*, so that the compound vessel will move in a lateral direction, so as to enable it to assume a curve or curves in horizontal planes in the direction of the vessel's length. The ends of the barges B B B B B B are made convex in form, the degree of convexity governing the curvature the compound vessel will be able to assume. For the two-

300 fold purpose of connecting these barges together, and for the purpose of steering the compound vessel, the apparatus *b*, which consists of a capstan or windlass, may be situated in the leading compartment A, or in one of the central compartments B, or in the stern compartment C; in the latter by preference. If, however, situated in a central compartment, which would be the more suitable position when the compound vessel is of considerable length, or when it is desired to form it into more than one curve, in such case a double capstan or windlass would be used. In all cases the chains which pass round the capstan or windlass barrels b^1 and b^2 are so arranged that they wind on *on* the one barrel whilst they wind off the other. From these barrels the chains or other connections *d d* are carried through the guide rollers *c*, one set of which are placed at each corner of the barges or compartments B B B B B B; these chains or other connections, after passing along each side of the compound vessel from the barge C to the barge A, are secured to the cross-head *e*, which works in a guide or guides on the deck of the compartment A, and is free to move in the direction of the vessel's length. From the cross-head *e* chains pass over the pullies *f f* to the ram h^1 of the hydraulic press *h*. When it is desired to tighten the chains or connections *d d*, a small pump communicating with the press *h* is set in motion, the degree of tightness or fixed tension being regulated by the valve h^2. The power necessary for working the capstan or windlass *b* may be manual, or derived from power required to propel the compound vessel, or by an independent engine, which latter is preferred. By these arrangements it will be evident that in order to steer or guide the compound vessel it will only be necessary to turn the capstan or windlass in any direction in order to force the head or leading compartment of the compound vessel in the direction the motion of the capstan or windlass may act.

Figure 3 represents on an enlarged scale the side elevation of one of the barges. Figure 4 is a horizontal view, and figure 5 a section through the same. *h* and h^1 represents one of the side doors and frames. These doors when made of wood are arranged to fit against a narrow metallic surface; if made of metal, to fit against a wood or a surface of elastic material. They are held in position by a chain or

chains passing over the pulley *i* to a capstan or windlass arrangement *j*.

I do not limit myself to the precise arrangement of parts hereinbefore described and illustrated for carrying my arrangement into effect, although the plans described are those I adopt.

Having now described the nature of my invention and the
301 manner in which the same is to be performed, I declare that I claim the combined arrangement of a compound barge or vessel hereinbefore described.

In witness whereof I, the said William Hamond Bartholomew, have hereunto set my hand and seal this twenty-fourth day of July, in the year of our Lord one thousand eight hundred and sixty-two.

W. H. BARTHOLOMEW. [L. S.]

London: Printed by George Edward Eyre and William Spottiswoode, printers to the Queen's most excellent majesty. 1862.

(Here follow diagrams marked pp. 302 & 303.)

308 UNITED STATES PATENT OFFICE.

Baron OSCAR DE MESNIL, of Brussels, Belgium, and MAX EYTH, of Stuttgart, Wurtemberg.

Letters Patent No. 86737, dated February 9, 1869.

Improvement in Propelling Vessels on Canals.

The schedule referred to in these letters patent and making part of the same.

To all whom it may concern:

Be it known that we, Baron Oscar de Mesnil, of Brussels, Belgium, and Max Eyth, of Stuttgart, Wurtemberg, have invented a new and useful improvement in propelling canal-boats and other vessels; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

This invention relates to a new and improved mode of propelling canal-boats and other vessels with steam as a motor; and

It consists in a peculiar application of the power to a wire rope, and in various means or appliances connected therewith, as hereinafter fully shown and described, whereby all the difficulties hitherto attending the success of steam as a motor on canals, rivers, and streams are successfully obviated.

In the accompanying sheet of drawings—

(Here follow diagrams marked pp. 304 to 307, incl.)

Figure 1, sheet No. 1, is a side view of a steam-tug and a portion of a canal-boat in tow, and having our invention applied to them.

Figure 2, a plan or top view of Fig. 1.

Figure 3, an enlarged view of the drum on the tug, over which drum the wire rope or chain passes.

Sheet 4. 4 Sheets.

De Mesnil & Eyth.

Towing.

No. 86,737. Patented Feb. 9, 1869.

Fig. 14.

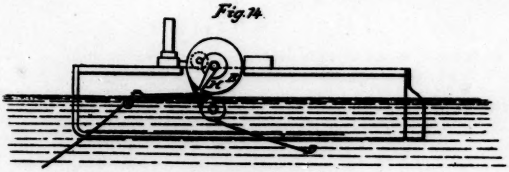


Fig. 15.

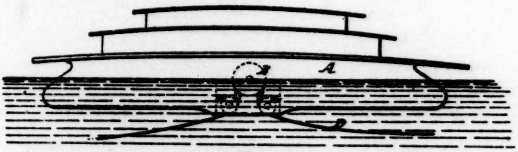


Fig. 16.

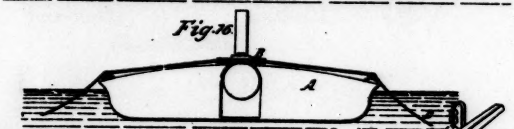
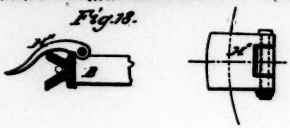


Fig. 17.

Fig. 18.



No. 368.
M. Creary
vs.
Pr. Canal Co.
Defendant's Exhibit
No. 28.

} p. 304

Witnesses
Thos. Tingle
J. A. Fraser

Inventors.
Baron Oscar de Mesnil
Max Eyth
By Munn & Co
Attorneys

Sheet 4. 4 Sheets.

De Mesnil & Eyth.

Towing.

No. 86,737. Patented Feb. 9, 1869.

Fig. 14.

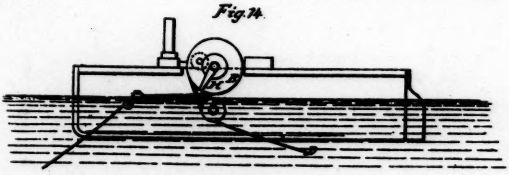


Fig. 15.

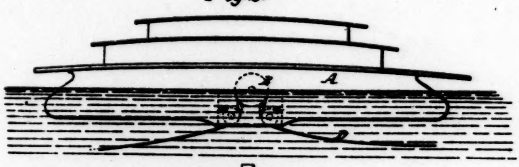


Fig. 16.

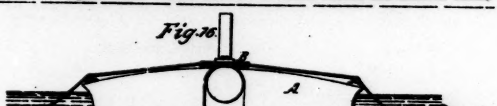
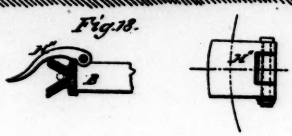


Fig. 17.

Fig. 18.



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v.
Pa. Canal Co.
} p. 304

Defendant's Exhibit,
No. 28.

Witnesses
Thos. Tingle
J. A. Fraser

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Mary Eyth
By Munn & Co.
Attorneys

Sheet 3. 4 Sheets.

De Mesnil & Eyth.
Towing.

No. 86,737. Patented Feb. 9, 1869.

Fig. 9.

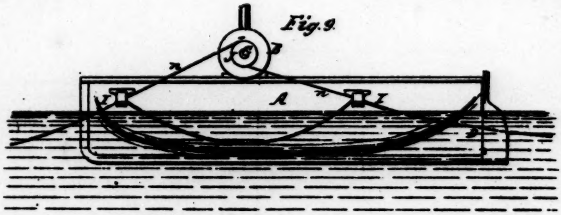

Fig. 10.

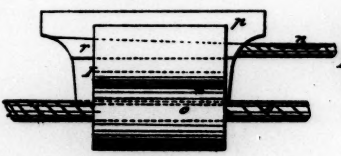

Fig. 11.

Fig. 12.

Fig. 13.

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McCreary
Pa. Canal Co.
} p. 305

Witnesses.
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J. A. Fraser

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Max Eyth
Per Munn & Co.
Attorneys.

Sheet 2. 4 Sheets.

De Mesnil & Eyth.

Towing.

No. 86,737. Patented Feb. 9, 1869.

Fig. 5.

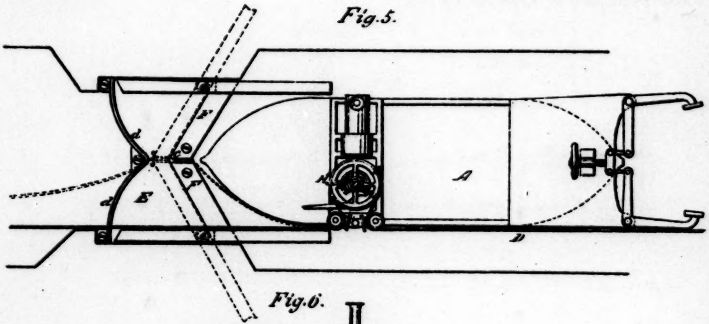

Fig. 6.

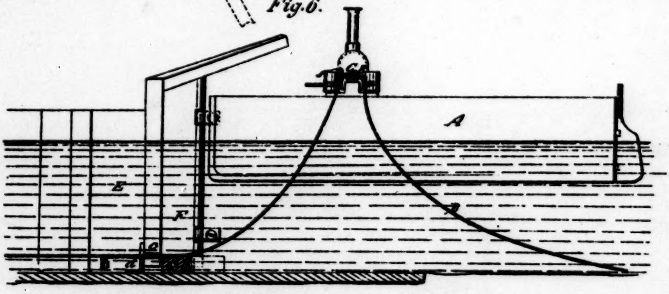

Fig. 7.

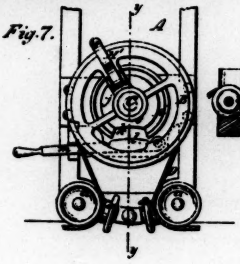

Fig. 8.

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v.
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} p. 306.

Witnesses
Theo Tusche
J. A. Fraser

Inventors.
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Max Eyth
Per Munn & Co.
Attorneys

Sheet 1. 4 Sheets.

De Mesnil & Eyth.

Towing.

No. 86,737. Patented Feb. 9, 1869.

No. 368.
McCleary v. Pa. Canal Co. } p. 307

Fig. 1.

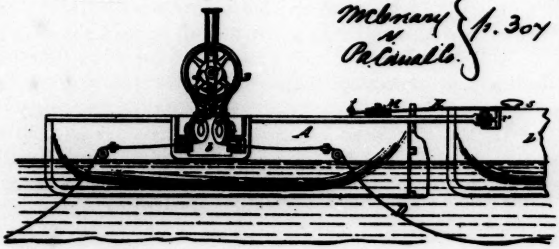


Fig. 2.

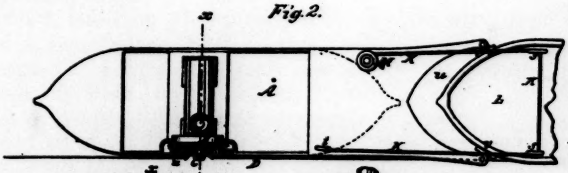


Fig. 3.

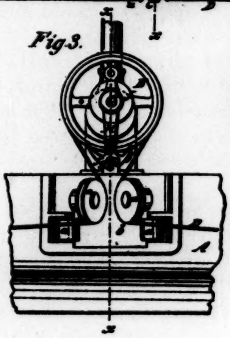
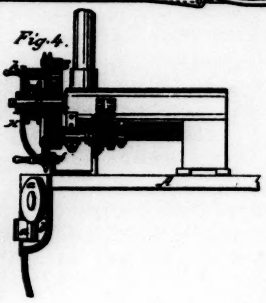


Fig. 4.



Witnesses.
Theo Gusche
J. A. Fraser

Inventors.
Baron Oscar de Mesnil
Max Eyth
Pa. Munn & Co
Attorneys

Figure 4, a section of the same taken in the lines *x x*, Figs. 2 and 3.

Figure 5, sheet No. 2, a plan or top view of a modification shown in the figures on sheet No. 1.

Figure 6, a side view of Fig. 5.

Figure 7, an enlarged view of the drum shown in Figs. 5 and 6.

Figure 8, a section of the same taken in the line *y y*, Fig. 7.

Figure 9, sheet No. 3, a view of the apparatus for forming the slack in the rope, in order to facilitate the adjustment of the same over the drum.

Figure 10, an enlarged detached side view of the gripe or clutch employed with the apparatus for forming the slack in the rope.

Figure 11, an end view of Fig. 10.

Figure 12, a plan or top view of a series of boats connected together by our improved plan.

Figure 13, a transverse section of Fig. 12, taken in the line *z z*.

Figure 14, sheet No. 4, a side view of a tug, showing the operation of the mechanism employed for casting the wire rope from the propelling-drum when required.

Figure 15, a view, showing a modification in the arrangement or application of the propelling-drum.

Figure 16, a view, showing another modification in the application of the propelling-drum.

Figure 17, a view, showing the means whereby the wire rope is strained or has its tension regulated to suit circumstances.

Figures 18 and 19, a view of a modification of the means for throwing the rope off from the propelling-drum.

Similar letters of reference indicate corresponding parts.

A (see drawings on sheet No. 1) represents a steam-tug, provided with a steam-engine, of any proper or suitable construction, and having a drum, B, placed loosely on a fixed shaft, C, over which a wire rope, D, passes, the latter being made to "hug" the periphery of the drum—that is to say, kept in contact with a sufficient portion of its periphery to insure the requisite degree of friction necessary for the propulsion of the tug and boats connected therewith.

This end is attained by guide-rollers, *a a*, as shown clearly in Figs. 1 and 3.

The wire rope is submerged in the canal or stream, and secured at both ends, and as the drum B is rotated, the friction of the rope on the drum is designed to be sufficient to cause the boat to be propelled along.

If necessary, however, the drum B may be provided with clips or clamps at its periphery, so arranged as to grasp or "bite" the rope, and insure the propulsion of the boat.

A modification of the application of the drum B is shown in the drawings on sheet No. 2.

In this arrangement, the drum has a horizontal position, and the guide-rollers *a* are placed on the top or deck of the boat, instead of at the side, as shown in sheet No. 1.

The former application involves the necessity of a recess or chamber, *b*, being formed in the side of the tug or boat, to receive

the guide-rollers *a*, and this is attended with considerable trouble and expense in the building of the tug or boat, and precludes the application of the vertical drum to tugs or boats not built expressly for its use.

The modification exhibited in the drawings on sheet No. 2 obviates this difficulty, as will be readily seen.

The rope D is designed to pass through the locks, E, of a canal, and underneath the gates F of the locks, as shown in Fig. 6; and in order to prevent the rope being caught between the bottoms of the gates and the side-piece G thereof, the outer edges of the gates have horizontal grooves, *c*, made in them, near their lower ends, one in each gate, to receive and catch the rope as the gates are being closed, two segments, *d d*, being secured to the bottom of the lock, on which the rope rests, and which prevent the latter from sagging and passing underneath the gates, the segments being portions of circles, of which the axes, *e*, of the gates are centres, and so placed that the outer edges of the gates, in being opened and closed, will just clear them.

By this arrangement, as the gates are closed, the rope will be pressed towards the centre of the side-piece G, and will remain between the edges of the two gates while the same remain in a closed state. (See Fig. 5.)

309 It is designed to have one end of the rope D connected to a windlass, operated by a screw and worm-wheel, as shown in red in Fig. 16 at a^x.

By this simple arrangement, the rope may be kept at a proper degree of tension at all times, and this is an important feature, in a practical point of view, as the rope requires to be let out when there are many tugs or boats applied to or connected with it, for a considerable length of rope is taken up by its passage around the propelling-drums.

As tugs or boats are detached from the rope, the latter will require to be tightened, to take up the slack caused thereby.

In order to cast the rope off from the propelling-drums, which is often required, to allow one tug or boat to pass another, and also for other purposes, the following apparatus is employed:

On the outer end of the shaft C, (see sheet No. 1,) there is fitted loosely an arm, H, one end of which is curved inward, and provided with two prongs *f f*, the outer ends of which fit in the groove in the periphery of the drum, in which groove the rope works.

The space between the prongs *f f* forms an eye, *g*, to catch the rope.

This forked end of the arm, when not in use, is in contact with the lower part of the drum, owing to the superior gravity of that end of the arm, and in consequence of the arm being fitted loosely on the shaft, and not turning with the drum. (See Figs. 1, 3, and 4.)

When the rope is to be cast off, the end of the arm opposite to that provided with the prongs *f*, has a pin, *h*, (see Fig. 4,) passed through it, said pin extending into the drum, and securing the arm to the latter, so that the arm will rotate with the drum, and the pronged end of the arm pass underneath the rope, so as to cast the latter from the drum. (See Fig. 14.)

In sheet No. 2, a modification of this casting-off apparatus is shown, a bent lever or arm, H′, being attached to the horizontal drum B, the upper arm extending beyond the periphery of the drum, and curved downward, as shown clearly in Fig. 8, and the inner arm extending downward into an annular groove, *i*, in a fixed plate, *j*, underneath the drum.

This groove *i* is not continuous, or does not form a complete circle, a break, *k*, being in it to allow a curvature, *l*, on a pivoted bar, *m*, being adjusted into the groove, said curvature, when thus adjusted, causing the inner arm to be forced inward or backward, and the upper arm consequently forced downward, so that it will catch underneath the rope (see Fig. 8), and cast the same off from the drum.

Another modification of this casting-off apparatus is shown in Figs. 18 and 19, the latter consisting simply of a hinged bar, H″, which may be adjusted over the drum B, as shown in Fig. 18, so as to cast off the rope, or be turned outward or backward, so that it cannot come in contact with the rope.

In order to avoid any difficulty in applying the rope to the propelling-drum, an apparatus is employed for forming a slack in the rope.

This apparatus (see Figs. 10 and 11) consists of two clamps I I, to which supplemental ropes or chains *u u* are attached, the latter being connected to opposite sides of a pulley, J, fitted on the shaft C, outside of the drum B, and connected therewith. (See Fig. 9.)

The clamps I I are each composed of two parts, *o p*, the part *o* being what may be termed a shell, being of V-shape at its lower part (see Fig. 11), and having a taper groove, *q*, in the inner surface of each side, to receive cleats *r*, of corresponding shape, at each side of the part *p* in which the ends of the ropes or chains *u u* are secured.

The lower edges of the part *p* are grooved or hollowed out in semicircular form, and the parts or shells *o* of the clamps are fitted on the rope D, and the parts *p* fitted in the parts *o*, the cleats *r* of *p* fitting in the grooves *q* of *o*, and in consequence of the grooves and cleats being of taper or wedge-form, or shape, the pull of the supplemental ropes or chains *u u*, on the parts *p*, caused by the winding up of said ropes or chains on the pulley J, will cause the lower edges of *p* to bind or clutch the rope D firmly, and form a slack in the same, which will admit of it being readily adjusted on drum B.

This pulley, or pulley-drum, is also advantageously used for hauling boats through locks, and also for hauling boats of a train or series together, a suitable rope or chain being attached to the pulley-drum for that purpose.

In attaching boats to the tug, and to one another, a rope or chain-connection may be used, as shown in sheet No. 1, K representing the rope or chain passing around hooks or pins *s*, on the boat L, and attached to a hook, *t*, on the tug, the opposite end of the rope or chain being connected to a windlass, M, on the tug.

The bow of the boat is fitted in a recess, *u*, corresponding in shape

to the bow of the boat, and having pivoted plates *v v* attached to its ends, which serve as bearings for the boat L. (See Figs. 1 and 2.)

For connecting a series of canal-boats together, two lines *w w* are employed, as shown in Fig. 12.

These lines are attached to the ends of swivel-bars N, which are pivoted centrally to bars O, the latter being fitted transversely on the boats at some distance from their bows. (See Fig. 13.)

By this arrangement, the boats are allowed to turn freely, and conform to the sinuosities of the canal, without getting out of line, as would be the case were they connected by a single rope, chain, or line.

In certain cases, it might be preferable to have the rope D pass over the deck of the tug, instead of having it at one side of the same, and in this instance, the rope may pass over guide-rollers on the tug, as shown in Fig. 16, and in certain cases, the propelling-drum B may be placed in the hold of the tug, as shown in Fig. 15, in which case the rope D will be entirely out of the way.

It will be seen, from the above description, that the invention is applicable not only for propelling canal-boats, but also for ferry-boats on streams capable of having a submerged rope or chain stretched across them, and the invention will also be serviceable in streams where there are rapids, as a wire rope may be submerged in the rapids, and boats enabled to pass through or over them without any difficulty whatever.

We claim as new, and desire to secure by letters patent—

1. The casting-off apparatus, consisting of an arm, H, H′, or H″, attached to or connected with the propelling-drum B, or its equivalent, and arranged substantially as shown and described, so that, by a simple adjustment, the arm may be thrown in contact with the rope, and, by the revolution of the drum, cast off the rope from the latter.

2. The clamps I I, constructed and applied to the rope D, in connection with the pulley J and supplemental ropes *n n*, or an equivalent means, for the purpose of forming or producing, when required, a slack in the rope D, to facilitate the placing of the rope on the drum.

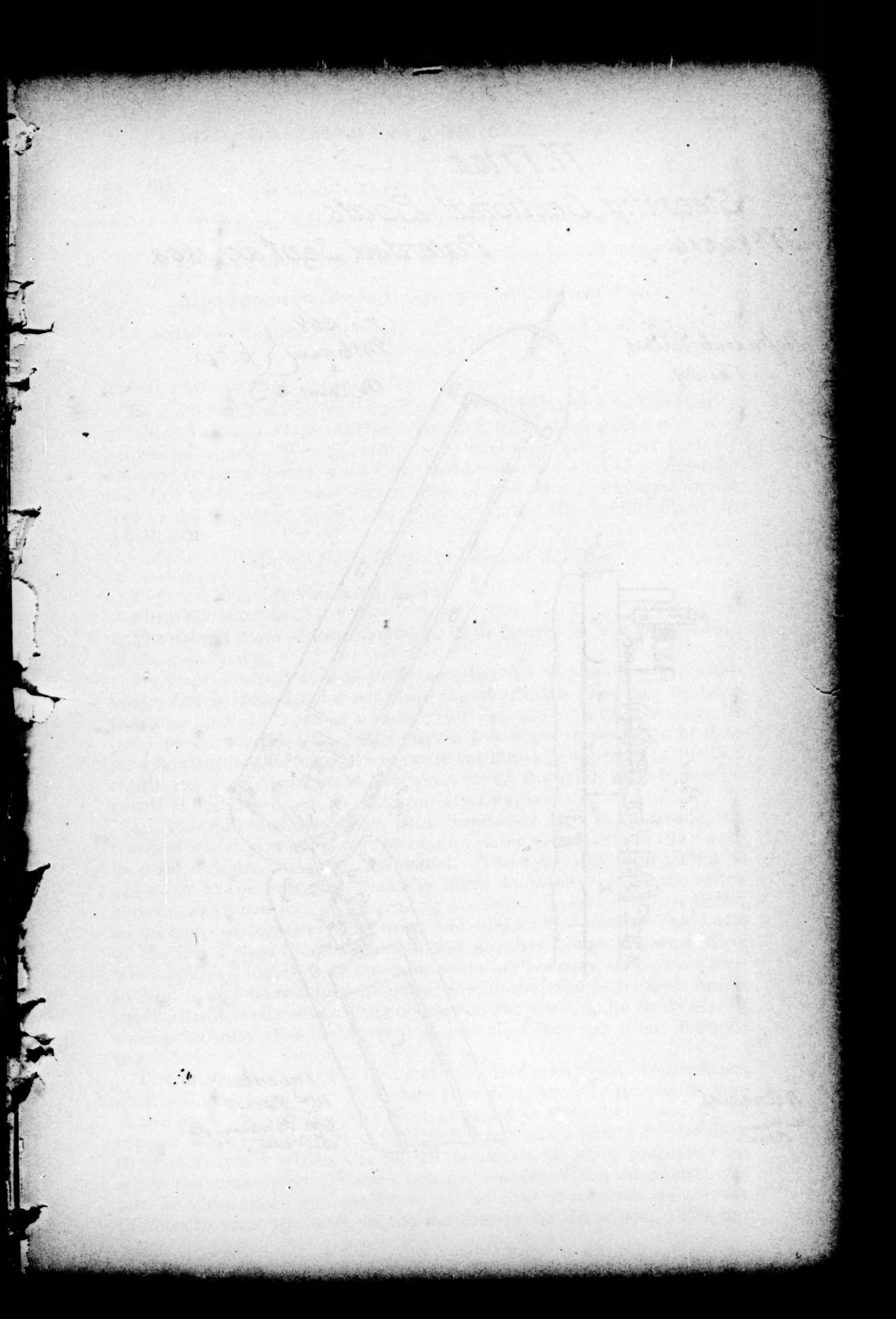
3. The two segments *d d* at the bottom of the lock E, in connection with the grooves *c* in the edges of the gates F, all arranged substantially as and for the purpose specified.

4. The swivel-bars N, in combination with the lines *w w*, all arranged and applied substantially in the manner as and for the purpose set forth.

The above specification of our invention signed by us, this 14th day of October, 1867.

BON. OSCAR DE MESNIL.
MAX EYTH.

Witneses:
WM. M. McNAMARA.
ALEX. F. ROBERTS.



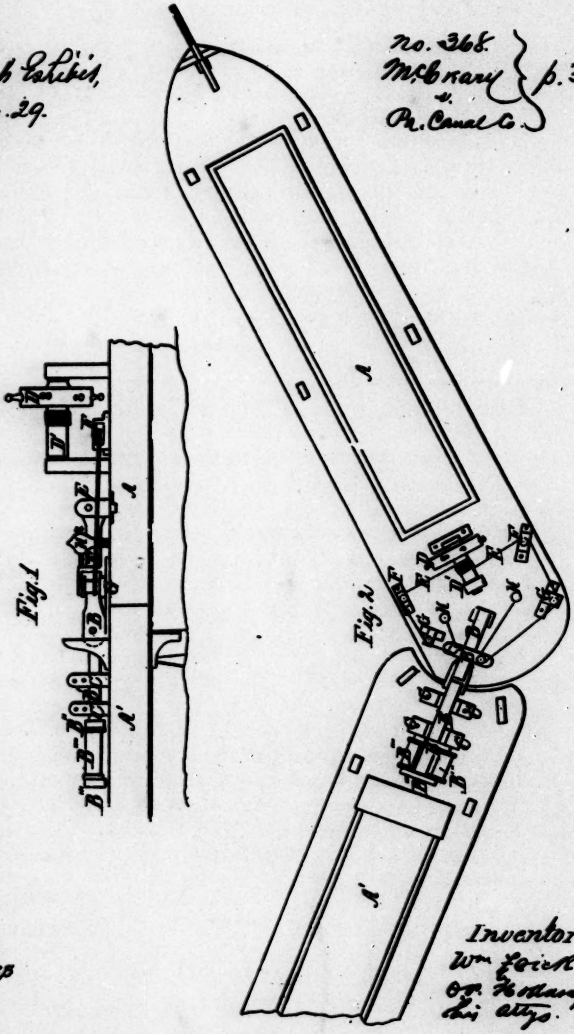
W. Frick.

Steering Sectional Boats.

No. 82,614. Patented Sept. 29, 1868.

Defendant Exhibit, No. 29.

no. 368. McCleary v. Pa. Canal Co. } p. 310



Witnesses
[illegible]

Inventor
Wm Frick
Or. Holloway & Co
his attys.

311 UNITED STATES PATENT OFFICE.

WILLIAM FRICK, of Middletown, Pennsylvania.

Letters Patent No. 82614, dated September 29, 1868.

Improvement in Steering-Apparatus for Sectional Boats.

The schedule referred in these letters patent and making part of the same.

To all whom it may concern:

Be it known that I, William Frick, of Middletown, in the county of Dauphin, and State of Pennsylvania, have invented a new and improved mode of connecting and steering boats, particularly adapted to canal-boats; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making part of this specification, in which—

(Here follows diagram marked p. 310.)

Figure 1 is a side elevation, and

Figure 2 is a plan.

The same letters are employed in both figures in the designation of the same parts.

My improvement is especially adapted for application to canal-boats, and is intended for coupling together boats in such a manner that one boat shall act as a rudder for the other, thus enabling the boats to be turned in passing curves too short to permit a boat to pass having length enough to give it the tonnage-capacity of the two combined, and also in the combination of the parts by which this result is accomplished, to be hereinafter explained.

In the annexed drawings, A A′ represent two canal-boats, the hulls of which are of regular form, and so constructed that they may be used independently or connected. The overhang of the deck is cut away at the stern, so that one shall be concave and the other convex, as shown in Fig. 2, forming a bearing, upon which the boats, when coupled together, may turn, one against the other. The hulls of the boats ought not to touch one another below the water-line when coupled together, but a water-space left between them, as shown in Fig. 1, as I have found by experiments that the boats steer much more satisfactorily when thus connected than when the hulls are in such proximity that the current cannot flow between them in turning.

The boats are connected by a coupling-bar, composed of two pieces, B B^1, hinged together. The part B is permanently pivoted to one of the boats, A, and the part B^1 is attached to the other boat, A′, by means of the standards C C, which are firmly bolted to the deck thereof, between which the bar B^1 is placed, in such manner that while the cross-head B^2 bears against one set of the standards, the bar B^1 shall bear against them all, so that it may act as a lever thereon to turn the boat, in the manner to be described. The bar

B^1 passes through a slot in the cross-head B^2, which slides thereon. The cross-head B^3 is rigidly attached to the end of the bar B^1, and springs, B^4, are placed on pins attached to one of the cross-heads, and projecting through holes in the other, so that when in tow, the strain on the line may be relieved, in case of sudden jerks, by the compression of the spring. This spring may be of India rubber, as shown, or spiral, or in any other convenient form. This arrangement is especially necessary when a number of boats are in tow of a tug, on wide sheets of water. The joint in the bar B B^1 allows free vertical oscillation in riding the swells, and as the bar B^1 turns freely on its own axis between the standards, the free rocking of the boats from side to side is permitted, while they are perfectly controlled in their relative alignment by the bar.

I have shown, in the drawings, stern-posts attached to one of the boats, for the purpose of attaching thereto a rudder, but this is only a precaution against accidents which might render it necessary to ship a rudder. The boats act, one as a rudder for the other, and are controlled in the following manner: D is the wheel, constructed in the ordinary manner of ship's wheels. D′ is the axle, around which is coiled the tiller-rope E, which unwinds on one side as it is wound up on the other. The rope is passed over sheaves F F, on each side of the deck, and thence around the sheaves G G, and thence around sheaves in the ends of the arms B^5, rigidly attached on each side of the bar B, and then the ends are securely fastened to the posts H H.

As the wheel is turned in one direction, the rope on that side being wound around the axle D′, the strain of the tiller-rope will be brought to bear on the arm B^5 of the rod B, which, acting as a lever, whose fulcrum is on one boat and the resistance in the other, will cause the two boats to deflect from a right line, the bow of one being inclined to the right, and that of the other to the left. By this means, one boat is made to act as a rudder for the other, and the boats may be turned around curves precluding the use of large boats, and as the boats are detached simply by unshipping the connecting-bar, the boats may be passed through locks that
312 would not permit larger boats to pass. By this means, much heavier freights may be drawn with the same team on canals too small to permit the use of the larger class of boats.

What I claim as my invention, and desire to secure by letters patent, is—

1. The hinged coupling-bar B B^1, when fastened permanently to one boat, and attached to the other by standards C C, in such manner as to permit a free, vertical, longitudinal, and lateral oscillation, but to confine, at the same time, the boats to their relative alignment fore and aft, substantially as set forth.

2. The combination of said hinged coupling-bar, standards, and cross-heads C C, connected by springs B^4, arranged to operate substantially as and for the purpose set forth.

3. The combination of the wheel, the tiller-rope, and the hinged bar connecting the two boats, when arranged to operate substantially as set forth.

W. FRICK.

Improvement in Combined Coupling and Steering App.

No. 5,000. Reissued July 23, 1872.

No. 368.
McCreary } p. 313.
R. Canal Co.

Defendants' Exhibit
No. 30.

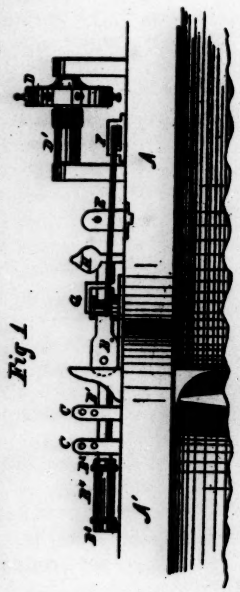


Fig 1

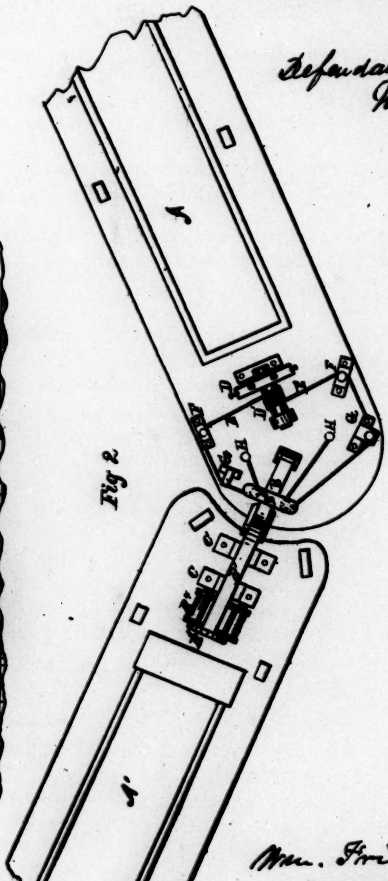


Fig 2

Witnesses
H. Bradford
A. Ruppert.

Wm. Frick
Inventor
D. P. N. Bowers & Co
Attys

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM FRICK.

Witnesses:
EDWIN JAMES.
JOHN S. HOLLINGSHEAD.

314 UNITED STATES PATENT OFFICE.

WILLIAM FRICK, of Middletown, Pennsylvania, assignor to CHARLES H. FRICK.

Improvement in Combined Coupling and Steering Apparatus.

Specification forming part of Letters Patent No. 82614, dated September 29, 1868; Reissue No. 5000, dated July 23, 1872.

Specification of an improved mode of connecting and steering boats, particularly designed for canal-boats, invented by William Frick, of Middletown, in the county of Dauphin and State of Pennsylvania.

This invention relates to an improved mode of connecting and steering boats arranged to run on canals in train, so that heavier freight may be drawn by the same team where the size of the canal, its curvatures, or the capacity of the locks will not permit an increase in the dimensions of the boats. To this end my invention consists in the combination in a train of boats of a flexible connection, which, at the same time, maintains a space between the boats for the free flow of the current between the stern of one and the bow of the next in series, and a steering mechanism acting from one boat upon the other, so that by the action of the steersman stationed upon one boat the boats in train may be deflected. My invention further consists in peculiarities of construction of the steering mechanism, to be hereinafter particularly designated.

In the annexed drawing, figure 1 is an elevation of two boats coupled together, and Fig. 2 is a plan of the same.

(Here follows diagram marked p. 313.)

A A′ are two boats, having convex bows and sterns, so as to admit of their being separately navigated. The decks are overhung, but the overhangs are cut away, so that the concavity of one shall fit into the convexity of the other, forming a bearing, upon which the boats, when coupled together, may turn one against the other. The boats, when coupled together, should not have their hulls in contact, but have a water-space left between them, as shown in Fig. 1. The boats, as I have shown them, are connected by a coupling-bar, composed of two pieces, B B^1, hinged together. The part B is permanently pivoted to one of the boats, A, and the part B^1 is attached to the other boat A′ by means of the standards C C, which are firmly bolted to the deck thereof, between which the bar B^1 is placed in such manner that while the cross-head B^2 bears against one set of the standards the bar B^1, placed between them,

shall bear against them all, so that it may act thereon as a lever to turn the boat in the manner to be described. The bar B^1 passes through a slot in the cross-head B^2, which slides thereon. The cross-head B^3 is rigidly attached to the end of the bar B^1, and springs B^4 are placed on pins attached to one of the cross-heads, and projecting through holes in the other, so that when in tow the strain on the line may be relieved, in case of sudden jerks, by the compression of the spring. The spring may be of India rubber, as shown, or spiral, or in any other convenient form. This arrangement is especially necessary when a number of boats are in tow of a tug on wide sheets of water. The joint in the bar B B^1 allows of free vertical oscillation in riding the swells, and, as the bar B^1 turns freely on its own axis between the standards, the free rocking of boats from side to side is permitted, while they are perfectly controlled in their relative alignment by the bar. I have shown in the drawing stern-posts attached to the boat A for the purpose of attaching thereto a rudder, but this is only a precaution against circumstances which might require the shipping of a rudder.

The boats act one as a rudder for the other, and are controlled in the following manner: D is the wheel, constructed in the ordinary manner of ships' wheels. D′ is the axle, around which is coiled the tiller-rope E, which unwinds on one side as it is wound up on the other. The rope is passed over sheaves F F on each side of the deck, and thence around the sheaves G G, and thence around sheaves in the ends of the arm B^5, rigidly attached on each side of the bar B, and then the ends securely fastened to the posts H H. As the wheel is turned in one direction, the rope on that side being wound around the axle D′, the strain of the tiller-rope will be brought to bear on the arm B^5 of the bar B, which, acting as a lever whose fulcrum is one boat and the resistance on the other, will cause the two boats to deflect from a right line, the bow of one being inclined to the right, and that of the other to the left.

I am aware that boats have been heretofore proposed to be coupled by a flexible connection, serving also to maintain a constant water-space between them, but without means for steering the boats
315 in train, one from another. I am also aware that means have been heretofore proposed for steering boats in train, one from another; but in such cases no water-space was provided between the boats, and, as a consequence, the difficulties of steering the boats were greatly increased by the current from one setting against the side of the next in series. I believe myself to be the first to combine the two systems, thereby relieving the intercommunicating steering apparatus from undue strain, and affording the means for conveniently and economically steering boats in train.

What I claim as my invention, and desire to secure by letters patent, is—

1. The combination, with boats, of the coupling and steering mechanism, substantially as herein described, whereby the boats are maintained at a fixed distance apart so as to permit the free

flow of the currents between the hulls when turning a curve, and said boats are steered one from another, as set forth.

2. The hinged coupling-bar B B^1, when fastened permanently to one boat and attached to the other by standards C C in such manner as to permit a free vertical, longitudinal, and lateral oscillation while controlling the alignment of the boats, substantially as set forth.

3. The combination of said hinged coupling-bar, standards, and cross-heads C C, connected by springs B^4, arranged to operate substantially as and for the purpose set forth.

4. The combination of the wheel, the tiller-rope, and the hinged bar connecting the two boats, arranged to operate substantially as set forth.

In testimony whereof I have signed my name to the foregoing specification in the presence of two subscribing witnesses.

WILLIAM FRICK.

Witnesses:
THOS. W. FRICK.
GEO. W. SALSMAN.

316 McCREARY *vs.* PENNA. CANAL CO. } U. S. C. C., E. D. of Penna.

DEF'D'T'S EXHIBIT No. 31. Sam'l Bell, Sp. Ex'r.

The U. S. Patent Office.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the bound volumes of the library of this office of the specification and drawing in the matter of English letters patent granted W. H. G. Field, dated June 16th, 1853, No. 1460, for constructing and steering barges and vessels.

In testimony whereof I, R. H. Duell, Commissioner of Patents, have caused the seal of the Patent Office to be hereunto affixed this seventh day of April, in the year of our Lord one thou-
[SEAL.] sand eight hundred and seventy-six, and of the Independence of the United States the one hundredth.

R. H. DUELL,
Commissioner.

317 A. D. 1853. No. 1460.

Constructing and Steering Barges and Vessels.

Provisional specification left by William Henry Grey Field at the office of the Commissioner of Patents, with his petition, on the 16th June, 1853.

(Void by reason of notice to proceed not having been given within the time prescribed by the act.)

I, William Henry Grey Field, of Kennington, in the county of

Surrey, do hereby declare the nature of the said invention for "certain improvements in the construction of barges and vessels and in the mode of steering" to be as follows (that is to say):

My invention consists, firstly, in the mode of building or constructing barges and vessels as aforesaid of such form that they may be more conveniently adapted for being worked in trains or otherwise upon canals, rivers, or other navigable waters than hitherto, whereby considerable advantages are obtained in the advantageous disposal of the power employed and in the space and diminished resistance offered to the water.

318 The accompanying drawings—

(Here follows diagram marked p. 319.)

represent at Fig. 1 a top or plan view and at Fig. 2 a side elevation of my improved barges or vessels; at Fig. 3 a separate view of the stem, showing the mode of working the two rudders, and at figures 4 and 5 front and side views of the same. In each figure *a a* represents the sides of the barge or vessel; *b b*, the head or stem; *c c*, the stern; *d d*, festoon chains for coupling the barges or vessels; *e e*, rope for attaching the train of barges or vessels together, the head of one being so formed as to fit closely into the stern of another, yet easily attached or detached at pleasure; *f f*, rudders.

Secondly, my invention relates to the mode of steering the said barges or vessels as aforesaid, so as to render them suitable for turning or moving in any curvilinear direction that may be required. I employ for this object chains or ropes conveniently secured to the sides of such barges or vessels and so situated that by the unslacking of either side the requisite curve or course may be obtained, at the same time providing against too great a separation of the several barges or vessels by means of small festoon side chains attached thereto.

Claim: Firstly, barges or vessels as above described; secondly, the mode of steering as aforesaid.

Ex'd: L. P. H.

320 And afterwards, to wit, on the 14th day of December, A. D. 1876, this cause come on to be heard upon pleadings and proofs, and, being fully argued by counsel for the respective parties, the court takes the same under advisement.

321 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit.

JOHN MCCREARY *vs.* THE PENNSYLVANIA CANAL COMPANY. } No. 66. October Sess., 1873. In Equity.

Per curiam:

The bill here is founded upon a reissued patent to the complainant for "improvement in coupling and steering canal-boats."

This reissue is alleged to be invalid as being for a different invention from that described in the original patent. The difference be-

(1 SHEET)

A.D. 1853. June 16. No. 1460.
FIELD'S PROVISIONAL SPECIFICATION

No. 368.
McCreary
v.
Pa. Canalls.
p. 319

FIG. 1.

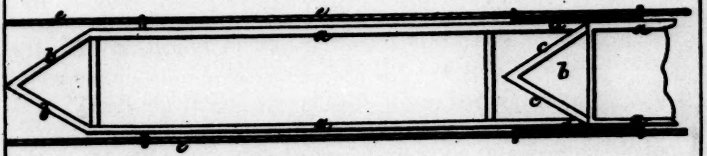


FIG. 2.

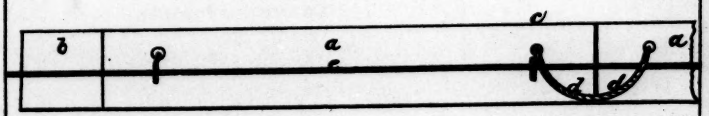


FIG. 3

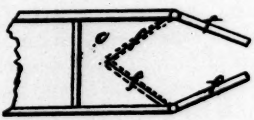


FIG. 4.

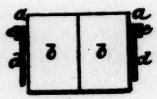
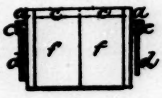


FIG. 5.



tween the two patents consists in a slight change in the points of attachment of the coupling and centering chains "D" to the stern of the forward boat, which appears only in the drawing attached to the reissue. It is altogether immaterial, inasmuch as the mode of operation, the manner of construction, or the function per-
322 formed *are* not in anywise affected.

The remaining defences do not require a detailed discussion. It must suffice to say that they are not sustained.

The allegation of infringement is supported by satisfactory evidence which the respondent's proofs have not overthrown, and none of the prior patents exhibited cover the complainant's invention.

There must, therefor-, be a decree for the complainant, but inasmuch as the allowance of an injunction would cause much greater injury to the respondent than benefit to the complainant the decree will be only for an account.

323 (Endorsed:) No. 66. October sess., 1873. C. C. U. S., E. D. of Pa. McCreary *v.* The Penna. Canal Co. Opinion. Filed October 28, 1880.

324 Circuit Court of the United States, Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } In Equity.

This cause, at a former term of this court, having come on to be heard upon the bill, answer, replication, testimony, and exhibits, and having been argued by counsel, it is now ordered and decreed by the court that the complainant's reissued patent in the bill described is good and valid in law.

That the said John McCreary was the first and original inventor and discoverer of the invention described and claimed in said patent and the specifications annexed thereto and is the exclusive owner of said patent.

That the said Pennsylvania Canal Company, defendant
325 herein, has infringed upon said patent and upon the exclusive rights of the complainant under the same—that is to say, by making and using one or more pairs of coupled canal boats, as charged in said bill of complaint.

And it is further ordered, adjudged, and decreed that the complainant do recover of the defendant the profits, gains, and advantages which the said defendant has received or made or which have arisen or accrued to it from the said infringement of said patent by the manufacture, use, or sale of coupled canal-boats, as described and secured by the said patent, since the date of said patent.

And it is further ordered, adjudged, and decreed that the said complainant do recover of the defendant his costs and charges and disbursements in this suit, to be taxed.

And it is further ordered, adjudged, and decreed that it be referred to Charles Howson, Esq., master, residing in the city of Philadel-

phia, to ascertain and take and state and report to the court
326 the number of pairs of coupled canal-boats made, sold, or used by said defendant, and also the gains, profits, and advantages which the said defendant has received or which have arisen or accrued to it since the date of said reissued patent infringing the said exclusive rights of the said complainant by the manufacture, use, and sale of the said improvements patented in the said letters patent, and also an account of the damages sustained by the said complainant by reason of said infringements.

And it is further ordered, adjudged, and decreed that the complainant on such accounting have the right to cause an examination of the officers and agents of said defendant, *ore tenus* or otherwise, and also the production of the books, vouchers, and documents before said master from time to time as said master shall direct.

By the court.

327 (Endorsed:) U. S. C. C. No. 66. Oct. sess., 1873. In equity. John McCreary *vs.* Penna. Canal Co. Decree. Entered & filed October 28, 1880.

328 Circuit Court of the United States, Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
PENNSYLVANIA CANAL COMPANY. } In Equity.

Master's Report.

To the honorable the judges of the circuit court of the United States for the eastern district of Pennsylvania:

Under decree filed October 28, 1880, the undersigned was appointed master in this case to ascertain and state and report to the court the number of pairs of coupled canal-boats made, sold, or used by the said defendant; and also the gains, profits, and advantages which the said defendant has received, or which have arisen or accrued to it since the date of complainant's reissued patent, from infringing the exclusive rights of said complainants by the manufacture, use, and sale of the said improvements patented in said letters patent; and also an account of the damages sustained by the said complainant by reason of the said infringement.

The case has been presented before the master by Messrs. J. J. Coombs and J. G. Johnson, for complainant, and by Messrs.
329 Henry Baldwin, Jr., and S. S. Hollingsworth for defendant.

Complainant has made no claim to nor proof of damages; the only injury, therefore, is as to the profits, savings, or advantages which have been received by or have accrued to defendant from its unauthorized manufacture, use, or sale of complainant's patented improvement.

The patent in suit is reissue No. 5630, dated October 28, 1873, granted to complainant for certain improvements in devices for steering canal-boats, whereby two boats are coupled together and

navigated and steered as one boat by means of a single steering wheel.

The proofs in the case show a number of prior examples of boats coupled together and navigated and steered as one boat by means of a single steering wheel, and the terms of complainant's patent itself shows the invention to have been a mere improvement, and one of very limited character.

The two claims of the patent read as follows:

First. The combination of two boats A and B, the steering chain *a* passing around sheaves or pulleys and around the windlass C or its equivalent, the overhanging guard or bumper on the stern of the forward boat, and the chain D attached to opposite points on the stern of said boat and to the stem or central part of the bow of the rear boat, so as to form an universal joint between them and keep them coupled and centered, substantially as shown and described.

330 Second. In combination with the boats A and B and the coupling and steering mechanism herein described, the claw-hooks *h h* for attaching and adjusting the coupling and steering chains, substantially as set forth.

As no proofs bearing upon the second claim have been offered, it is necessary to consider only the first claim, which is in form for a combination constituting an entire machine; but the statements of the specification are an admission that the combination of the two boats A and B, the stern chain *a* passing around sheaves or pulleys and around windlass C or its equivalent, and the overhanging guard or bumper on the stern of the forward boat was old, being shown and described in the prior patent of E. & J. McCreary, No. 125,684, and claimed therein, not in itself, but in combination with a particular device for "centering" the two boats and forming an universal joint between them, to wit, a "notch" in the overhanging guard of the forward boat, into which notch the stem or cut-water of the rear boat of the pair fits.

The combination of the patent in suit and that of the prior patent are practically identical in function and result, and are identical in constitution save only as to one particular element, the "centering" device.

As, therefore, the combination of the patent in suit is one, the sole invention and novelty of which consisted of a single element, the profit which complainant is entitled to recover from defendant in this case is that which he may have shown to have accrued

331 to it from the use of substantially that new element in substantially the combination in which he has described and claimed it.

It appears from complainant's proofs that in 1874 defendant had in use fifty-eight pairs of coupled boats containing complainant's said improvement; that in 1881 the number of infringing boats was one hundred pairs, and in 1882 one hundred and twelve pairs; that these boats have been used principally, if not solely, for carrying coal over defendant's canal and the waters communicating there-

with; that defendant has owned and used concurrently with its coupled boats and in the same business a number (gradually decreasing, it seems, since 1874) of single boats; that the average freight-carrying capacity of a pair of the coupled boats is rather more than double that of one of the single boats, and that for this reason and because less motive power and less manual labor are necessary to operate a pair of the coupled boats than to operate two of the single boats the rates of freight on the coupled boats have at all times been considerably lower than on the single boats.

Complainant claims to have proved that defendant has made a very large aggregate sum in "savings" by the transportation of coal in its infringing double boats in place of single boats, and asks that defendant shall pay over to him these savings (minus the cost of applying the couplings to the double boats) as its profits from the use of his improvement.

Defendant contends that no such "savings" have been shown to have accrued to it, and, further, that the entire savings from the use of the "infringing machines" do not constitute
332 the true measure of the "profits" which complainant is entitled to recover.

The master's judgment, upon the proofs before him, is with the defendant on this last and decisive point, for reasons hereinafter fully set forth.

But he deems it advisable, in case he shall be in error as to that, to state briefly certain findings as to the savings accruing from the shipping of coal upon defendant's infringing machines in place of its non-infringing single boats.

While the proofs show that from fifty-eight pairs in 1874 the number of infringing coupled boats built and used by defendant had increased to one hundred pairs in 1881, and to one hundred and twelve pairs in 1882, they do not show exactly what number of new boats was added, nor exactly what number, altogether, of the infringing boats was in use in any one of the years between 1874 and 1881.

It is shown that 24 cents per ton is the average of the varying differences between the different coupled-boat and single-boat freight rates which have at different times prevailed to one particular point (Baltimore), but what the differences in freight rates to points other than Baltimore have been, or what proportion of the entire traffic has been to Baltimore, or what total amount of coal has been carried on the defendant's boats, coupled or single, during the period to be covered by the account, to all points, or to any one point, or what amount of coal was carried in any one year in either of the two classes of boats, is not shown.

333 It is shown that in a boating season defendant's boats, if in continuous service, will make an average of from eight to ten trips from Nanticoke, the point of lading, to Havre de Grace, or an average of eight or nine trips to Baltimore, and that the infringing coupled boats carry, on the average, two hundred and fifty tons per trip.

As to the actual number of the infringing coupled boats which have been in continuous service during any one season, the only

testimony bearing upon the point is the statement of one witness that he has "seen as many as a dozen pairs under repair at one time," and that "as a general thing there are that many laid up for repairs."

Upon these incomplete data complainant has constructed a series of estimates, exhibiting as the estimated aggregate of the net profits or savings from the use of defendant's infringing coupled boats the sum of $269,509.76.

He first estimates that the number of infringing boats which have been used during the period to be covered by the account may be fairly stated as fifty-eight pairs (those in existence in 1874), in use nine years, and in addition the equivalent of twenty-four pairs in use eight years, this being an estimated average, based upon the assumption that the increase in the number of infringing boats from year to year after 1874 was regular. An exact calculation upon that basis would make the number of boats in use during the eight years equivalent to the use of twenty-seven pairs during the whole eight years, but complainant reduces the figures to twenty-four pairs in order "to be clearly within safe bounds."

334 Then the computation proceeds with an estimate that these boats have each performed annually (during a period as to fifty-eight pairs of nine years, and as to twenty-four pairs of eight years) an amount of service equivalent to the transportation of eight cargoes of two hundred and fifty tons each from Nanticoke to Havre de Grace, Baltimore, or Delaware City, making an aggregate tonnage of one million four hundred and twenty-eight thousand tons.

It is admitted that "the double boats do not all make full voyages to the places named, as some carry their cargoes to Harrisburg, Columbia, or other way places only." "But" (it is suggested), "of course, when the voyages are shorter they are made in less time, so that the result is the same as if all their voyages were full length."

From this estimated total tonnage a deduction of one-seventh is made (reducing the amount to one million two hundred and twenty-four thousand tons) as a "concession" or allowance for the fact "that some of the boats are sometimes laid up for repairs."

Still another "concession" or reduction of forty-four thousand eight hundred tons is made for the fact that in 1875 the coal transportation fell short of the average nearly two-fifths.

These deductions leave as the estimated tonnage the equivalent of one million one hundred and seventy-nine thousand two hundred tons carried to Baltimore, Havre de Grace, or Delaware City on the infringing boats.

335 Complainant then multiplies this amount of tonnage by 24 cents, that being the average ascertained saving per ton upon coal shipped in coupled boats to Baltimore. From the amount thus obtained ($283,008.00) he deducts $13,498.24, the ascertained aggregate cost of applying the couplings to one hundred and twelve pairs of boats, leaving $269,509.76, which amount he claims as the "clear profit or saving made by the use of complainant's invention from 1874 to 1882, inclusive."

The master fails to find warrant in the proofs either for complain-

ant's method of estimating the amount of service performed by the infringing boats or for his application to all the tonnage thus estimated of the ascertained average saving per ton upon the unascertained amount of tonnage actually carried to Baltimore.

Admitting that so far as the proofs indicate anything on the subject they indicate that the results thus reached by complainant may be and probably are within the truth; that the actual savings in freights by the use of the infringing boats have probably been greater than the estimated saving exhibited by complainant's computation, it yet seems to the master that he is not at liberty to adopt as the basis of any finding in this case a computation of which almost every step is matter of more or less arbitrary—however, probably moderate—conjecture.

The only clearly ascertained elements entering into the calculation are the number of infringing boats in use in 1874, the total increase in the number during the period from 1874 to
336 1882, the average carrying capacity of the boats, and the cost of couplings.

Complainant urges that the present is a case in which defendant has "withheld statements which it would seem it ought to be able to make," and has exhibited "evident unwillingness to account," and that for this reason less strictness of proof should be required of complainant than under ordinary circumstances."

The master does not think that as to this it is necessary for him to say more than that, in his opinion, the record does not show such exhaustion by complainant of the means and avenues of inquiry open to him, accompanied by such evidently willful withholding by defendant of "statements" duly called for as to demand or warrant such a relaxation for complainant's benefit of the rules of proof, such a supplying of the want of proof, by voluntary conjecture as (it seems to him) would be involved in the finding which complainant asks.

It is stated in the annual report of the president of the defendant corporation for 1874 that "the freight transported by the company in its own boats upon the enlarged part of the canal during that year was equivalent to thirty-three million four hundred and four thousand two hundred and forty-nine tons moved one mile," and that "this was done in fifty-eight double and fifty-one single boats; that the average freight paid boatmen on the main line was, in double boats, five hundred and twenty-six thousandths of one cent per ton per mile, and that the freights in single boats exceeded those in double boats exactly twenty-five per cent."

337 It is sufficiently proved that each pair of double boats will carry at least twice as much as each single boat. A simple computation upon this basis, assuming the service performed by the two classes of boats to have been strictly proportionate to their respective capacities, exhibits a result for that year of the equivalent of twenty-three million two hundred and two thousand nine hundred and fifty-one tons moved one mile in double boats at an expense for "freights" of twenty-five per cent., or $30,511.88 less than it would have cost to effect the like movement in the single boats.

If from this amount be deducted $6,990.16 (the cost of applying couplings to fifty-eight pairs of boats, the number in use in 1874), the result is an estimated net saving for that year of $23,521.72. To adopt this estimate, however, is to assume, without proof, that the relative proportion of coupled and of single boats in actual use was practically constant throughout the year, and that the conditions of the business were such that the actual amount of service respectively performed by the two kinds of boats was in strict proportion to their respective capacities.

In short, this estimate is based solely and entirely upon evidence as to the number of the respective kinds of boats in use during, but not necessarily therefore throughout, the year and their average capacities. Beyond that all is conjecture—arbitrary, however plausible. For these reasons, the master does not think himself at liberty to adopt this estimate as a finding.

338 The master finds proved savings to the amount of $12,278.07 by the shipment of coal in defendant's infringing double boats instead of single boats to one consignee in Baltimore during the years from 1874 to 1882, both inclusive, and savings to the amount of $634.17 by shipments to another consignee during the years from 1874 to 1881, both inclusive, making a total ascertained saving of $12,912.24.

The number of infringing boats engaged in the traffic involving this saving appears to have been 69 pairs, and deducting $8,315.88, the cost of applying the couplings to these boats, leaving a net saving of $4,596.36.

But defendant objects that these savings are not shown to have been received by it, and the proof on the subject is unsatisfactory and obscure. The master finds that defendant's manner of using its infringing boats has been to lease them to boatmen who have operated them, and that up to a time pending this inquiry the leasing was by a form of lease contract which bound the lessees to use the boats for freighting coal therein for defendant and for no other person or persons without defendant's consent. The boatmen derived their profit from the freights paid to them by the shippers, and the form of lease contract referred to provided that the defendant might retain the rental for the boats out of the freights earned.

Almost all if not all the cargoes for defendant's boats and all of those upon which the master finds proven savings appear to
339 have been furnished by an allied corporation, the Susquehanna Coal Company, in which the corporation defendant was at one time a large and is still a considerable stockholder. The two corporations have, in part, the same officers and directors, and the relations of the two are such that the president of the defendant corporation as vice-president of the coal company and "anxious to promote the interest of both" has "required the latter company to ship a portion of its coal by the canal" (since the canal cannot get any from other sources), "notwithstanding that such shipments are against the interest of the coal company, since it could ship its coal much more cheaply by rail."

The freight rates have been fixed, it would seem, and paid by the

coal company, so that primarily and ostensibly the savings in freights by shipping on the coupled boats instead of single boats accrued to the coal company.

It is clear, however, that defendant owns the infringing boats, and that they have been used by its procurement and under its control and for its own advantage, indirect if not direct.

If thus owning and controling and using or procuring to be used the infringing boats the defendant corporation has, in consequence and as part of a business arrangement with an allied corporation for the mutual advantage of the two, permitted the savings or part of the savings arising from the use of its boats to go to that allied corporation, it would seem that defendant should not thereby escape accountability for these savings.

340 Aside from that, the facts of its ownership and control of the boats give rise to the presumption that defendant is the party to whom the saving arising from the use of them has ultimately, if not primarily, accrued, and other proof goes far to strengthen this presumption. The truth of the matter is within the cognizance of defendant, and if, under the circumstances, doubt and obscurity attend the question, that doubt and obscurity should not prejudice complainant.

It seems that defendant's general business of operating its canals has for years been conducted at a loss or without profit, owing to the successful competition of railroads, and that the cheapening of the canal transportation has been an important object to defendant, that it might reap some profit from the general business or, at any rate, reduce the losses. The adoption and use of these infringing coupled boats was one of the means resorted to to that end. That they have proved an efficient means is the only inference to be drawn from the fact that the number of coupled boats owned and used by defendant has been continually increasing, not only before but since the decree of the court, while the number of its single boats has been decreasing. Under these circumstances the difference between double and single boat freight rates, as representing the extent to which the canal transportation was cheapened to defendant's direct advantage by the adoption and use of the infringing boats, might, it would seem, well be taken as the measure of the profits, savings, or advantages accruing to defendant itself from that use.

341 The master, therefore, finds an ascertained saving accruing to defendant of $4,596.61 from the carrying of coal in its infringing coupled boats instead of its single boats.

But he is of opinion that the complainant is not entitled upon the proofs in the case to recover from defendant as its profits from the use of his "improvement" the entire savings in freight accruing from the shipping of coal in the infringing coupled boats in place of single boats.

The parties are agreed that when the invention infringed is a mere improvement on an old machine the patentee is entitled to recover from the defendant the profits only which the latter has made from the use of the improvement; and, further, that it is in-

cumbent upon the complainant in presenting his proofs before the master to distinguish between the profits derived from the use of the improvement and those derived from the general business of using the entire machine, including the improvement.

As stated in the preceding part of this report, the improvement of complainant's patent is a combination of which the novelty and invention resided solely in one new element, to wit, a specific kind of "centering" device, the "chain D," and it follows, therefore, that the profit which complainant is entitled to recover is that which his proofs may show to have been derived by defendant from its use of substantially the "chain D" in substantially the combination claimed.

Complainant founds his claim to the measure of recovery asked for upon the ground that the proofs show no prior systems of
342 coupled boats open to defendant to use and which were fitted to be used by it with any advantage over its single boats.

It appears that two of these prior systems of coupled boats, respectively referred to in the proofs as "The Experiment" and "The Sixteenth Amendment," were practically used and for a considerable period of time and upon defendant's canal; that these boats contain substantially the steering gear (to wit, the steering chains, sheaves or pulleys, and windlass) of complainant's patent, and that defendant was at liberty freely to use such coupled boats and every feature involved therein. But complainant contends and the proofs satisfy the master that these boats were not adapted for defendant's use with any advantage over single boats, because their construction was such that a rudder could not be applied to the forward boat. These prior boats were in other respects inferior to the machines of complainant's patent, but their vital defect for defendant's purposes was this inability to apply a rudder to the forward boat, which was therefore unmanageable when separated from its mate.

It seems that the locks or some of the locks of defendant's canal are or were single locks—*i. e.*, sufficing for the passage of one boat only at a time—so that in passing these locks the coupled boats require to be uncoupled and navigated and steered through the locks separately.

In addition to this it is necessary, in order to reach the markets for a large portion of the coal shipped over defendant's canals,
343 that the boats shall be towed over a long stretch of open bay, for which purpose it seems that it is very desirable, if not positively necessary, that the boats shall be capable of being separately navigated and steered.

The same defect which unfitted "The Experiment" and "The Sixteenth Amendment" for defendant's use would attach to coupled boats such as those described in the English patents of Bartholomew and of Bourne, referred to by defendant as showing other prior systems of coupled boats which it might have freely used.

But the ability to apply a rudder to the forward boat as well as to the rear boat of a pair of defendant's infringing coupled boats is an advantage due not to complainant's combination, but to one particular, and that an old, element of the combination, to wit, "the over-

hanging guard or bumper on the stern of the forward boat," and to this same single element, apparently, is primarily due every other advantage which defendant's boats have over such boats as "The Experiment," and every advantage, save one, which they have over boats such as "The Sixteenth Amendment."

Now, defendant might have freely used every part of the combination of complainant's patent short of the whole.

It was at liberty to use an overhanging guard or bumper on the stern of the forward boat and to couple boats of that construction and steer them as one by means of chains, sheaves, pulleys, and windlass, such as described in complainant's patent, and it is not liable to complainant in this suit for any profits, savings, or
344 advantage which may have accrued to it from the employment of these features severally or in combination. The profit for which it is liable is that which it may be proved to have derived from the combination with these features of substantially a particular "centering device," the "chain D."

Before complainant can recover from defendant the fruits of advantages inherent in certain parts of his combination—and those parts not of his invention nor patented, but open to common use—he must at least show that defendant could not have reaped any part of those fruits had it not used his entire combination.

Do the proofs show the "chain D" of complainant's combination to be so vital an element of the machine that without it the machine would be worthless or worthless for defendant's use? To answer this question in the negative is necessarily to reject complainant's claim of "profits."

The chain D is described in the patent as a "coupling" and "centering" chain. For coupling purposes it is clearly not necessary, that function being performed by the steering chains. Its material function is that of keeping the two boats "centered"—that is, preventing sidewise movement of the stem of the rear boat out of line with the centre of the stern of the forward boat. It forms, in fact, what may be termed a close central "hinge" between the forward and the rear boat.

That a device for this purpose is a useful and desirable feat-
345 ure of the machine the proofs show, but not that it is so essential a feature that to it may be attributed the whole value of the machine.

That a centering device is not essential to the practical use of coupled boats and upon defendant's canal is shown by the fact that the boats referred to in the proofs as the "Sixteenth Amendment" and the "Frick boats" were practically used there, each for a number of years. The construction and mode of operation of these boats were such that the turning a curve necessarily took the centre of the bow of the rear boat out of line with that of the stern of the forward boat. There is no doubt that this was an objectionable feature in these boats and one calculated under particular circumstances to lead to mischievous results, but that of itself it made the machines worthless or *worthless or* without advantage for defendant's use does not appear. Indeed, such a finding is forbidden as to the

"Sixteenth Amendment" by the testimony in this case of complainant himself, by whom and his brother that boat was built and put into use on defendant's canal.

If the lack of a centering device would necessarily be attended with so much graver disadvantages in machines such as those of complainant's patent than in machines such as the "Sixteenth Amendment" as to make the use of it a necessity in the former case while it was not in the latter, the proofs do not show it.

The broadest conslusion which the proofs on this subject warrant is that if, in turning a curve, the stem of the rear boat is free
346. to depart too far from a line with the centre of the stern of the forward boat, objectionable or even mischievous results may follow.

This fact had been recognized and a remedy provided long before complainant's invention. The English patent of Bourne shows and describes what the patentee terms a "check-chain," being a chain attached at one end to a point near the centre of the stern of the forward and at the other end to a point near the bow of the rear boat, and of a length sufficient to allow of a certain amount of sidewise motion and no more.

This device it was open to defendants to use in combination with its boats, and the same may be said of the chain connection shown, but not patented, in the United States patent of Stackpole, No. 53088.

Neither the Bourne nor the Stackpole device is the same in specific arrangement, mode of operation, or effect as the chain D of complainant's patent, and therefore the use of them by defendant in connection with its boats would not infringe his claim.

Neither device would serve to hold the cut-water of the rear boat at all times in substantial contact with the overhanging bumper on the stern of the forward boat nor to prevent side play; but plainly either device could be used with so much of the beneficial effect of complainant's chain D as would arise from preventing more than a limited amount of side play or from preventing the boats from necessarily drifting apart in case of breakage of the steering chains.

To regard such chain connections as the Bourne and Stack-
347 pole devices as "equivalents" of complainant's chain D would, it seems to the master, render it very hard to find patentable invention in complainant's combination, in view of the prior state of the art.

He was not the first to "hinge" the stem or cut-water of the rear boat centrally upon the stern of the forward boat of coupled pair—that feature was contained in the "Experiment" and is fully shown and described in the English patent of Bartholomew—nor the first to so "hinge" boats of precisely the construction and with substantially the very same results and advantages as set forth in his patent, for such a combination is fully described, shown, and claimed in the prior patent of E. & J. McCreary. The invention, therefore, of the patent in suit must be regarded as having consisted solely in a specifically new kind of "centering" device or hinge of a particular described construction and mode of operation.

Upon the proofs before him the master cannot find that the whole value to defendant of its infringing machines has been due to the use therein of that invention in combination with the old elements which they were at liberty to use and in combination with which complainant has claimed it.

Consequently the master feels constrained to report that he finds no proven profits, savings, or advantages to have been received by or accrued to defendant from the manufacture, use, or sale of complainant's patented improvements.

348 The master will file in the office of the clerk of the court, in connection with his report, printed copies of the proofs and exhibits which have been submitted before him.

Appended to this report are copies of the exceptions thereto, which have been presented to him on behalf of both parties to the suit, and he will file the originals of the same in the office of the clerk of the court.

Respectfully submitted.

CHARLES HOWSON, *Master.*

(Endorsed:) No. 66. Oct. sess., 1873. Circuit court U. S., eastern dist. of Pa. John McCreary *vs.* Pennsylvania Canal Company. In equity. Master's report. Filed Jan. 12, 1885.

349 In the United States Circuit Court, Eastern District of Pennsylvania.

JOHN MCCREARY *vs.* THE PENNSYLVANIA CANAL COMPANY. } In Equity. No. 66. October Session, 1873.

Before C. Howson, master.

Testimony on Behalf of Complainant.

350 APRIL 25, 1881.

Present: J. J. Coombs, Esq., and J. G. Johnson, Esq., for complainant; S. S. Hollingsworth, Esq., for respondent.

ISAAC J. WISTAR, president of the corporation defendant, being duly sworn, deposes as follows in response to interrogatories by complainant's counsel:

Question. In the report made by you as president of the Pennsylvania Canal Company for the year ending December 31, 1874, it is stated that "the transportation which was performed by the company in its own boats upon the enlarged part of the canals during that year was equivalent to 33,404,249 tons moved one mile," and that this was done in fifty-eight double and fifty-one single boats. Please state whether all of these double boats were coupled and rigged in substantially the same manner as the model put in evidence by the defendant, marked "Defendant's Exhibit No. 19."

Answer. I cannot say without knowing what the model referred to is.

Q. 2. Will you answer that question after examining the model referred to in the office of the clerk of the court?

A. Yes; I will answer it at any time that I can.

Q. 3. Please state how many additional pairs of boats were coupled by the company during the year 1875.

A. I do not know.

Q. 4. Can you not ascertain how many from your books and papers?

A. I cannot say whether the detail papers for that year are preserved in the local office or not.

Q. 5. Will you examine with a view to answering the question at a future time?

351 A. I will.

Q. 6. Will you please examine and state at a future time, if you can, how many boats were coupled by the company in each year from 1875 to 1880, inclusive?

A. I don't see how I can, because boats are coupled and uncoupled continually. Two boats may go single a certain distance and then be coupled for the remainder of the distance, and the converse. A boat may make one trip single and the next trip couple with another. It would be next to impossible to pick out each case in which a boat was coupled. A boat may make ten trips during the season single and one trip or part of a trip coupled.

Q. 7. What I want to ascertain is, to how many boats was the coupling mechanism or rigging applied during each year?

A. Couplings of various kinds were continually attached and removed from the boats, according to the exigencies of the trade in the opinion of the local official. It would be impossible to trace each boat or each kind of coupling. Our books are kept with reference to tonnage and with no reference to coupling or the condition of the boat.

Q. 8. When boats are coupled in the manner that your boats generally are, are there not certain permanent fixtures attached to the boats that are not removed when the boats are run single?

A. Some of the boats have the necessary hooks, staples, etc., attached to them and such boats can be coupled or uncoupled in a few minutes. Most of our boats have not such staples and hooks attached. Such boats can only be coupled by ropes or chains or rods.

Q. 9. Can you state to how many boats the coupling rigging has been applied up to the present time?

A. I cannot.

Q. 10. Have you no means of ascertaining that fact?

A. Well, perhaps so; I cannot say positively. If yes, it will be through men who have been in our employ.

Q. 11. Will you try to ascertain with a view to answering hereafter?

352 A. Yes. Our superintendent of that department, Mr. Stickney, left us at the end of 1880, and is now away—is, I think, in New Hampshire or New York.

Q. 12. In the report for 1874 it is stated that "the average freight paid to boatmen on the main line, which included boat service,

labor, motive power, and every expense of transportation, except canal tolls, was, in double boats, .526 of 1 cent per ton per mile;" and it is also stated that "the freight in single boats exceeded that in double boats exactly 25 per cent." Are these statements correct?

A. I presume I supposed them to be so at the time; that was seven years ago.

Q. 13. Do you not still suppose them to be correct?

A. Approximately so.

Q. 14. How many tons of coal are usually carried on a pair of coupled boats per trip?

A. Each boat runs from 80 to 100 tons; there is no uniformity about it. Some divisions of the canal only admit much smaller smaller boats, and on all divisions customers' orders are frequently for less than a full load.

Q. 15. Double boats, as I understand, are only run on the enlarged part of the canal. Is that so?

A. Yes; nowhere else.

Q. 16. How many tons are usually carried on the single boats?

A. The same—according to how the customer orders; he may order 50 tons or may order 100.

Q. 17. If, in 1874, each pair of double boats carried on the average twice as much coal as each single boat, the proportions of the 33,404,249 tons moved one mile (or equivalent thereto), on 58 double and 51 single boats, would be, on double boats, 23,202,951 tons and a fraction, and the proportion moved in single boats, 10,201,297 tons and a fraction. Is not this statement correct?

A. No; it is not correct nor anywhere near correct, because that was not probably the proportion in which the double and single boats were operated during the season. For instance, any
353 specific boat may have made one trip coupled to another, and twenty trips as a single boat; in which case, though classed as a double boat on account of the one trip, yet $\frac{2}{4}\frac{0}{1}$ths of the whole freight for the season was carried by her as a single boat and classed in that category. Besides, it appears that there were only 58 boats coupled to another at any time during the season; many of these were only coupled for one trip; some for a part of a trip. But if the whole of them had run as coupled boats during the entire season and had equalled in average length of trips the single boat, which they do not, even then they could only have transported $\frac{5}{1}\frac{8}{0}\frac{}{9}$ths of the tonnage. I do not believe, though it is impossible to say with accuracy, that 10 per cent. of the tonnage reported was carried in coupled boats while they were coupled.

Q. 18. Do you now mean to say that where it is stated *that* on page 9 of your printed report for 1874 that "this was done in 58 double and 51 single boats, etc.," that it means not 58 pairs of boats, but 58 boats coupled in 29 pairs?

A. No; I mean this: that it was done in 51 single boats never coupled at any time or for any purpose during the season, and in 58 single boats which at some time or another during the season were coupled together in pairs.

Q. 19. Then, according to your present statement, the 58 double

boats and 51 single boats included but 109 boats regarded as single boats?

A. That is my understanding of it.

Q. 20. On page 13 of said printed report I find this statement under the head of "The Equipment:"

"The number of boats belonging to the company is—

"Coal-boats (main line)	168
"Lumber-boats (west branch)	13
"Juniata boats (Juniata)	4
"Total	185"

How do you reconcile this statement that there were 168 boats on the main line with your statement that there were only 109 boats, including the double and single boats?

354 A. I never made any such statement as the latter, nor did my report of 1874, which states that certain freight, to wit, coal, on the main line was carried in 109 boats.

Q. 21. Where two boats are coupled together would you call that pair of boats two double boats?

A. The language used by our men is very indefinite. They often speak of a boat as a double boat simply because it is running double on that particular trip, though, of course, it would be ridiculous to use the language in regard to them as you put it.

Q. 22. Would it not be equally ridiculous where 58 boats are coupled together, making 29 pairs, to designate those as 58 double boats?

A. In your better knowledge of literary excellence it may be an improper use of terms, but 58 double boats would mean, in the understanding of the boatmen, that many boats which could be or had been coupled.

Q. 23. Are you sure that in 1874 the company did not have the coupling rigging on 116 boats that could be coupled together with that rigging, making 58 pairs?

A. I am sure of very little of what happened in 1874; but that is the way I understand that report, and I have no doubt, though entirely derived from others, it was approximately correct at the time, and that there were only 58 boats used coupled.

Q. 24. I understand the canal company leases its boats to boatmen, who do the carrying on their own account. Are boats with the coupling rigging on rented to boatmen at the same rates as single boats, or boats not having the coupling rigging?

A. Precisely, I believe. The canal company leases its boats at so much per ton carried for all classes, sizes, and character of boats, single and double, and the rate is the same for all classes and sizes. The canal company is perfectly indifferent whether the coal is carried in single or double boats; it does not gain or lose a cent by either one over the other. There is not and never has been a dollar gained or saved by the use of double boats, unless in the

355 saving of the contractor or lessee, namely, the boatman who

uses them. The lessee pays the same boat hire for both classes of boats.

Q. 25. Is it not true that the boatmen get less per ton freight for coal carried on double boats than they do when carried on single boats?

A. The canal company is not a common carrier; has nothing to do with the freight. I have no means of knowing what bargains the boatman makes with the shipper. I suppose the lessees of both classes of boats make the best bargains they can for the freight.

Q. 26. How many shares of stock are there of the Pennsylvania Canal Company?

A. About 90,000; cannot tell exactly.

Q. 27. How many shares held outside of the Pennsylvania Railroad Company?

(Respondent's counsel asks the purpose of this question.)

(Mr. Johnson, for complainant, replies that he desires to prove by General Wistar that the Pennsylvania Canal Company and the Susquehanna Coal Company are owned and controlled exclusively by the Pennsylvania Railroad Company, which owns all the stock of both companies, excepting such shares as may be permitted to be held to qualify the officers; that the Pennsylvania Canal Company leases its boats in such a way that the Susquehanna Coal Company derives all the profit therefrom, and that almost all the coal transported on said canal is supplied and carried by the Susquehanna Coal Company in boats so leased.)

(Respondent's counsel objects to the question for the reason that it is a fishing expedition into the relations of the three companies named until they have first established that the Pennsylvania Canal Company and Susquehanna Coal Company both stand in the described relation to the Pennsylvania Railroad Company.)

Counsel further objects that General Wistar is put upon the stand as president of the corporation defendant, and in that capacity can only be called upon to give such information as that cor-
356 poration possesses as to the number of boats upon which the device was used and the profit or saving derived thereupon, and if called upon other matters, as, for instance, those contained in the question, he must be called as any other witness.

Mr. Johnson replies that General Wistar, being asked to account for profits derived by canal company, has said that it makes no profit out of the use of these boats as it leases them to others. We desire to show that these others are substantially the same parties, inasmuch as both are mere agent- of the Pennsylvania Railroad Company.

Master excludes question for the present, because if the question would be proper at any time in the present proceeding he does not see that any sufficient foundation has yet been laid for it.

Q. 28. How many of the double boats have been built by the Pennsylvania Canal Company?

A. All canal-boats built by the Pennsylvania Canal Company or any other person become double boats in boatman's language when-

ever coupled together, but many of the Pennsylvania Canal Company's boats have never been so coupled.

Q. 29. How many have been so coupled since 1874?

A. I could not tell.

Q. 30. What officer of the company can give the information?

A. No officer of the company for the period since 1874.

Q. 31. Do you know by whom these coupling contrivances were built?

A. I do not.

Q. 32. Were they built by an employee of the company or by an outside, independent contractor?

A. They were built or purchased by the company for its own boats so far as furnished with them, but I do not know whether they built or bought them. There were also different kinds of couplings.

Q. 33. Who are the officers of the Pennsylvania Canal Company for this year?

357 A. I am president; T. P. Haviland, treasurer; and A. Mordecai, secretary.

Q. 34. Who are the managers?

A. I. J. Wistar, George B. Roberts, Wistar Morris, Samuel M. Felton, M. Hall Stanton, Strickland Kneass, William Eisenbrey, Simon Gratz, and four others.

Q. 35. Does the canal company run any boats itself?

A. Not one, and never did, except repair flats, dredgers, etc.

Q. 36. Does the number of boats belonging to the canal company appear from time to time in the printed annual report?

A. No law or rule requires it, but I generally state them.

Q. 37. Those reports, as made and signed by you from time to time, embody the facts concerning the operations of the canal company, as known to yourself, do they not?

A. Yes, sir; I get them from my assistant.

Q. 38. How has the canal company been in the habit of using the boats belonging to it?

A. It does not use them at all; it lets them to boatmen who are generally without capital to build them themselves.

Q. 39. They are used exclusively in its canals, are they not?

A. No, sir; on the contrary, they are used in many canals and the public waters of the United States.

Q. 40. Are they used on trips that do not begin or end on the canal?

A. Frequently.

Q. 41. Is there a printed form of lease?

A. I think so.

Please produce a copy of the usual form of printed lease.

Q. 42. Do you recall any instances of a letting of your boats to boatmen who were permitted to take them off your canal and keep them off during the season?

358 (Objected to by respondent's counsel as immaterial and irrelevant.)

A. With our consent, certainly not; they often do it.

Q. 43. Are not these boats built for the purpose of being used on your canal, and in furtherance of its business?

A. Certainly; to encourage the use of the canal by drawing customers to it who may not have capital enough to furnish instruments of their own.

Q. 44. Are you not vice-president of the Susquehanna Coal Company?

A. Yes, sir.

Q. 45. Do you not know the fact that said coal company pays less freight per ton for coal carried upon double boats than they pay for coal carried on single boats?

A. I am under the impression that the Susquehanna Coal Company does not pay any freight at all. They are paid by the consignees. If the company pays any, it is very rarely. It is a miner, not a freighter.

Q. 46. Do you not know the fact that the boatmen receive less for the freight carried on the double boats than for those carried on the single boats?

A. I will say that the boatmen make the best bargains they can, and sometimes receive more on single than on double boats, but I have no doubt that in a close competition between them the double boatmen could carry somewhat cheaper, because I know that the boatmen think that they save a good deal of motive power by so simple a process of coupling as tieing two boats together with a rope.

Q. 47. At what point is the coal sold by the Susquehanna Coal Company usually deliverable?

A. It is delivered to its sales agents, if by railroad, at the mines, close by the breaker, according to railroad scales; if by canal, into boats at the breakers by weights ascertained at first weigh-lock below, sixteen miles distant.

Q. 48. Are not the contracts for freight of its coal through the Pennsylvania canal usually made with the boatmen by the coal company or its agents?

A. The contracts for freight are made by the agents of
359 the sales agents, who take up the boats and agree for the freight and certify the rate agreed on to the consignee.

Q. 49. Does the cheapness or dearness of the freight affect the price obtainable by the coal company for its coal?

A. Of course, the facility for getting the coal to market governs its price, as it does in any article. If, for instance, it could not be got to market at all it would have no value.

Q. 50. Apart from facility, does not mere cheapness of freight benefit the coal company?

A. I think that cheapness of freight benefits every inhabitant of the United States and throughout Christendom, coal companies among them, but it is a matter of opinion; the contrary has been held.

Q. 51. Is the coal company benefitted in no greater proportion

than the inhabitants of the country by the reduction of freight on Pennsylvania canal?

A. I think it is.

Q. 52. Is it not better able to compete with its rivals at shipping points reached by it through the Pennsylvania canal by being able to transport in boats so coupled that they can carry cheaper than boats not coupled?

A. I believe that the coal company would compete better with its rivals by shipping nothing on the canal whatever, and if I did not happen to be an officer of both companies, with a certain responsibility on me to earn the current expenses of the canal and its interest, which it is unable to do, I would, as officer of the coal company, ship every ton of its production by rail, as I do that of all the other coal companies of which I am an officer, and as I am constantly urged to do by the Pennsylvania Railroad Company as railroad proprietor.

Q. 53. Shipping coal by the canal is disadvantageous to the canal company?

A. Yes; it is. It would do better to abandon the use of the canal and ship by rail, and its local officers constantly urge me to do it, which I refuse beyond a certain extent, because anxious as
360 president of the canal to get some little earnings upon it, as it generally is unable to earn its current expenses and interest.

From memory I may state that it failed to do so by a loss of $70,000 in 1878 and of $50,000 in 1879, which loss was very much reduced in 1880—larger business.

Q. 54. The coal company being, then, obliged to ship its coal to its disadvantage by canal, have you not felt obliged, in order to diminish as much as possible this disadvantage, to secure by coupling contrivances on the boat the cheapest mode of transport possible?

A. Of course, it is my business, as president of the canal, to make transportation upon it as cheap as possible. Some years ago, during the period of my earlier annual reports, which I have handed to you, and to which you have referred in your questions, I was very enthusiastic upon this subject, hoping by enlargement of canals, coupling of boats, etc., to restore and maintain the solvency of this canal. I now believe, and have for some time believed, that I was entirely wrong; that railroad transportation is the cheapest and best; that the money I have persuaded our directors to invest in improving canal and building boats has been totally wasted, and that the canal should be entirely abandoned, as we are already abandoning parts of it from time to time as we can get legislative permission for the same.

Q. 55. Has the Pennsylvania Canal Company made any outlays since 1875, except out of receipts?

A. Yes, sir; I think in every year since 1875.

Q. 56. Have you ever abandoned the plan of coupling about which, some years ago, you were so enthusiastic?

A. No; we have not yet abandoned either the coupling, the boats, or the canal, but I have already acknowledged my error to my direct-

ors and have recommended them to abandon the whole line and all its appurtenances.

Q. 57. Have you not been yearly increasing the number of coupling contrivances?

A. No; I am strictly forbidden by my directors from increas-
361 ing the quantity of boating or equipment stock of any kind, but I build enough each year to maintain the stock, in my opinion, at its existing status.

Q. 58. Was the use of coupling contrivances one of the means by which you sought to increase the business of the canal and enable it better to compete with its railroad rivals?

A. Yes, sir. I invented and patented a coupling for that purpose, which I gave to the canal for its use gratis; but, as I said before, all these efforts have been failures. The canal tonnage has constantly decreased in spite of them, and is to-day pretty much confined to what I am able to get upon it, owing to my official position in another company.

Q. 59. The Susquehanna company?

A. Yes.

Q. 60. Have not these efforts tended to make the deficiency less than it otherwise would have been?

A. I hope so; but the receipts and tonnage have steadily decreased, notwithstanding, during a period when the whole tonnage of the country and of the district was stupendously increased.

Q. 61. Has not the decrease resulted from the inability of the canal to compete with the railroads as means of transportation?

A. Yes; I think so.

Q. 62. I see in the canal company's report for the year ending December 31, 1879, that there was a tonnage for that year through the canal of 446,111 tons Wyoming coal. Was not almost the whole of this Wyoming coal the product of the Susquehanna Coal Company's mines?

A. A majority of it was, although we are still able to get some coal on the canal from that region.

Complainant's counsel calls for the production, at next meeting, of printed copies of the report of the Pennsylvania Canal Company for the years 1874 and subsequent dates, and also of the Susquehanna Coal Company.

Q. 63. Who is president of the Susquehanna Coal Company?

A. George B. Roberts.

Adjourned to Monday, May 9, at 2 p. m.

362 JANUARY 11, 1882.

Present: Messrs. Coombs and Johnson, for complainant; S. S. Hollingsworth, Esq., for respondent.

Examination of ISAAC J. WISTAR continued:

Question 64. In the printed record of defendant's testimony, page 16, it appears that a model of a pair of coupled boats was introduced by defendant which, Mr. Whitney testified, represented the com-

pany's boats, and said model was put in evidence, marked "Defendant's Exhibit 19." Do you know where that model is?

Answer. I do not.

Q. 65. In the record of complainant's printed testimony, at page preceding 43, it appears that certain drawings of a pair of coupled boats were put in evidence by complainant, marked "Exhibit XX¹," which are stated to represent the coupled boats used by the Pennsylvania Canal Company. Do you know anything about that drawing?

A. I do not. None of the exhibits or testimony in the case are now or have been in my custody or possession since offered in evidence.

(Complainant's counsel states that the model referred to and the drawings "XX¹" are not to be found among the exhibits in this case.)

Q. 66. In your former examination, on April 27, 1881, you were asked how many additional pairs of boats were coupled by the company during the year 1875, and stated that you did not know. You were then asked whether you would examine your books and papers, with a view to answer at a future time, and answered, "I will." Have you made that examination, and are you now prepared to answer the question?

A. I did get what information I could on that and the other points I was so requested at that time, but as nearly a year has passed since it has entirely passed my mind now.

Q. 67. Do you think you can answer that question at any future time?

A. I do not know whether the records will give me the information or not.

363 Q. 68. What I want to ascertain is, to what number of boats was the coupling rigging used by the company applied in 1875.

A. If I can get the information I will give it.

Q. 69. Will you try to get that information?

A. I will.

Q. 70. Can you state to how many boats said coupling rigging was applied by the company in each year from 1874 to 1881, inclusive?

A. I cannot add anything on that subject to what I have said before.

Q. 71. Can you state to how many boats said coupling rigging has been applied, up to the present time, in the aggregate?

A. I cannot.

Q. 72. In your former examination you were asked this question, and also asked: "Have you no means of ascertaining that fact?" and answered: "Well, perhaps so. I cannot say positively. If yes, it will be through men who have been in our employ." You were then asked: "Will you try to ascertain with a view to answering hereafter?" and answered in the affirmative. Have you

tried to ascertain the fact, and can you now answer the question now?

A. So much time has elapsed since then, and so many other things have passed through my mind since, that I cannot remember what steps I took to inform myself at that time. I cannot answer the question now.

Q. 73. Will you make further effort to ascertain that fact?

A. If you will give me, in writing, just what you want I will go over it again, notwithstanding I have been all over the matter before.

Q. 74. You were asked on your former examination to produce a copy of your printed form of lease to boatmen, and you furnished a copy, which has not been put in evidence. I now hand you a paper and ask you if that is the copy which you furnished to counsel in answer to that question.

364 A. Yes, sir.

(Paper referred to offered in evidence, marked "Exhibit number 1, January 11, 1882.")

(Witness desires to add to his answer an explanation, as follows:)

As will be seen by the written statement endorsed on that form of lease by me, the lease was got up by subordinate officials without reference to me or to the company's solicitor, and is illegal in form and no longer used since my attention has been attracted to it.

Q 75. Will you please state whether the Pennsylvania Canal Company owns any stock of the Susquehanna Coal Company; and, if yes, how much?

(Objected to by respondent's counsel as irrelevant.)

(Question admitted, reserving objection.)

A. It owns about one-eleventh of the stock of the Susquehanna Coal Company.

Q. 76. Has it owned any larger amount at any former time?

A. Yes; at one time it owned one-fourth.

Q. 77. Is not the stock of the Susquehanna Coal Company valuable stock, and does it not pay liberal dividends?

(Objected to for same reasons; and, further, because, first, it is shown now affirmatively that the two companies are not identical; that the Pennsylvania Canal Company owns only one-eleventh of the coal company's stock; and, second, that even in an action of tort directly against the Susquehanna Canal Company the stockholders would not be liable, the very object of incorporation being to protect them from such responsibility, and *a fortiori* is this *is* the case where the action is brought against the stockholders themselves.)

(Question admitted, reserving objection.)

A. I don't know the value of it; don't know of any public sale. It has never paid any dividend since its organization, about fourteen years ago, except one of 4 per cent. this fall, just paid.

Q. 78. Has the Susquehanna Coal Company not made profits
365 that have never been divided or distributed in the way of dividends, profits which have been invested in the purchase of property or otherwise?

A. It has bought no property of any consequence since about the time of its organization, and has perpetually struggled with its expenses, and I may say inability to meet its engagements, until the high prices of coal this year enables it for the first time to earn something. The whole property can be bought for less than it cost, and the Pennsylvania Canal Company will be very glad to sell what stock it has at par, and probably less.

Q. 79. During what time did the canal company own one-fourth of the stock of the coal company?

A. It originally subscribed for about that amount; may have been more or less, but was itself, from time to time, in such pecuniary difficulties that it borrowed money on the stock, and ultimately the creditor took it for the debts as the only thing available that we had got. The Pennsylvania Railroad Company became ultimately the sole creditor as the only one willing to take the security.

Q. 81. As vice-president of the Susquehanna Coal Company, can you state how much of the stock of that company is owned by the railroad company?

(Objected to by respondent's counsel, and question ruled out.)

Q. 81. On your former examination you were asked to furnish printed copies of the annual reports of the Pennsylvania Canal Company for the year ending December 31, 1874, and all subsequent years. You have furnished counsel with copies from 1874 to 1880, inclusive, which complainant's counsel now puts in evidence. Can you now furnish copy of report for 1881?

A. No, sir.

Q. 82. You also furnished counsel with a copy of the report of the Susquehanna Coal Company for 1880, which complainant's counsel now puts in evidence. Can you furnish any other annual reports of the Susquehanna Coal Company?

A. No; they are not generally printed.

366 Q. 83. Complainant's counsel calls for the production of the following documents:

First. The "statements" of the "superintendent of equipment and the annual report of the chief engineer," referred to in witness' report for 1874 (as printed in pamphlet form), in the last paragraph on page 15, as being "annexed" to said report.

Second. The "reports of the chief engineer and superintendent of equipment," referred to in last paragraph on page 12 of witness' report for 1875 as being "annexed" to said report.

Third. The "reports of the chief engineer and superintendent of equipments," referred to in last paragraph, page 12, of witness' reports for 1878, 1879, and 1880 respectively—that is to say, the reports of said chief engineer and superintendent for each of said years.

Fourth. The reports of said chief engineer and superintendent of equipment for the years 1876 and 1877 respectively.

Fifth. Witness' annual reports for the years 1876 and 1877, as president of said canal company, or copies thereof.

A. Those reports of subordinates are not preserved and cannot be produced. They are only made to enable me to make my annual reports to the stockholders, and all features of them considered of any importance are embraced in my said reports. The originals are submitted to the board of managers in the original manuscript, and if no objection is made or verification of my report required they are not considered of any further consequence.

Q. 84. Are those reports not made in writing?

A. Yes, sir.

Q. 85. What is done with them?

A. Well, they go in with the rest of our waste paper.

Adjourned to Thursday, January 12, 1882, at 11 a. m.

367 THURSDAY, *January* 12, 1882.

Parties present as before.

Examination of I. J. WISTAR continued:

Question 86. Referring to paper marked "Exhibit 1," January 11, 1882, being printed form of boat lease, whose handwriting is the endorsement "Copy of printed form of boat lease"?

Answer. Mine, made in response to the call for it.

Q. 87. You stated yesterday that this form of lease referred to had not been used since your attention was attracted to the illegal form of it. Please state when your attention was so attracted.

A. When you called my attention to the subject by asking me to get this copy for you. Not attending personally to those shipments, I was not aware of the particular methods used by the shipping officials. I will say that I myself at that time, in looking over the subject, devised a better method, which we now pursue.

Q. 88. Are your company's boats not all numbered?

A. They all have a number assigned them when built; whether they are all so marked I do not know; if not, they ought to be.

Q. 89. Do you not know that during the last boating season there were at least 100 pairs of coupled boats belonging to the company in use on the canals, all having coupling and steering mechanism, invariably or almost invariably in the regular course of business run coupled together?

A. No; I do not know it and don't believe there were half as many coupled together or running coupled together at any time. A great many are necessarily used as single boats, for the reason that along the whole line of the canal, where a large part of the tonnage is carried, there are few customers who can or will take more than a single boat cargo at one time.

Q. 90. Were there not in use on the canal during the last boating season 200 boats having the same coupling and steering mechanism permanently affixed thereto?

368 A. No; there was not one boat having such attachments permanently attached thereto.

Q. 91. These boats having the coupling and steering mechanism referred to on them have what are called claw-hooks for hitching the chain. Is that not so?

A. Yes, sir; they have a claw-hook exactly such as has been used, to my knowledge, in the United States Navy for half a century.

Q. 92. Do you not consider those claw-hooks permanently attached to the boats?

A. My impression is there is nothing attached to the boats except ordinary hooks or rings for the purpose of attaching the coupling.

Q. 93. Are not those hooks or rings permanently affixed to the boats?

A. Yes; there are twenty or thirty of them attached to every boat, whether coupled to any other boat or not.

Q. 94. In every pair of boats is there not on one boat a steering wheel on a screw-axle?

A. On every pair of coupled boats, when coupled, the steering apparatus is applied—a model of which we have produced in this case.

Q. 95. If you cannot remember the construction of the coupling and steering attachment, how were you enabled to state that there was not one boat having such attachments permanently affixed?

A. In this way: I invented this coupling attachment myself. After years of experiments, through agents, with dynanometers and other tests, having all the reports and results of these experiments in my possession, I then went to work (knowing nothing of McCreary's experiments in the same direction, if he made any) to contrive a sort of coupling gear, the main object of which and the only thing that made it valuable to us was its capacity of being detached from one boat and applied to another with ease and dispatch as often as required. That was many years ago and details of construction are not now fresh in my mind.

369 Q. 96. Did you not take out a patent on your invention?

A. I did; and offered the use of it to all the world free.

Q. 97. Are the coupled boats of the company, in use on the canal, coupled in accordance with your patent of December 24, 1872?

A. I cannot say positively, but to the best of my knowledge they are. A good many small changes have been made from time to time.

Witness desires to add to what he has said before the following:

In relation to the alleged profits of the Susquehanna Coal Company from the use of these couplings, the said coal company does not now earn or save and never did earn or save one dollar or gain any advantage whatever from the use of these couplings or from the use of these or any boats or from the use of the canal or any part of it or any of its appurtenances whatever, whether belonging to the canal company or anybody else. Its shipment of freights consist exclusively of coal. It has and always has had four distinct and

separate rail lines to tide-water market, all bidding against each other for its freight, and the canal does not reach any point or market of any consequence whatever which is not reached quicker, better, and cheaper by one or other of those rail lines.

It would not ship one ton on the canal, except that I, being an official of both companies and anxious to promote the interest of both, require the Susquehanna Coal Company to ship a portion of its coal by canal, since the canal cannot get any from any other sources. Such shipments are against the interest of the Susquehanna Coal Company, for the reasons above given, and if the two companies were under different managements it would ship nothing by canal, but everything by rail, as all other coal-producers do in that region.

Questions by Mr. HOLLINGSWORTH, for respondent:

370 Q. 98. Whether the rate of freight paid by the coal company was dependent upon or in any way connected with what the freighters might be able to carry it for upon the canal?

A. The rates are fixed entirely by the rail rates prevailing at the time. Sometimes the freighters can make a living and sometimes, according to their statements—which I believe—they cannot. My belief is that during the past year they have not earned expenses. I am sure the canal has not.

Q. 99. Then any advantage, if there is any, which might arise from what has been held to be an infringement is to the freighters, and does not concern the coal company at all. Am I right in this?

A. The coal company has no interest in it whatever, direct or indirect, and would be quite as well or better off if all the boats were sunk and the canal dried up to-night.

By Mr. COOMBS:

Q. 100. In your annual report, as president for the canal company, for the year ending December 31, 1874, you state that the freight in single boats exceeded that in double boats exactly 25 per cent. Who made that saving of 25 per cent. upon coal freighted on double boats?

A. If my conclusions were correct, then the person using the boat made it; but I am now and have for some time been satisfied that my board of managers were right and I was wrong in all those conclusions which I tried so hard at the time to establish. I believed at that time with all the ardor of a new broom trying to sweep clean that I could find economies to apply to canal transportation, this among others, that would keep them abreast of the enormous economies attained by the rival railroads, who, during this period, have reduced the cost of their transportation from three or four cents per ton per mile on average grade to about four mills per ton per mile. It took me some years to find out, as I now have, that with the very best intentions it was impossible; that canals can no longer compete with railroads for transportation, and must perish. It

is a question of a very short time when they must be aban-
371 doned. We would have abandoned the canal before now but for the obligations to maintain it assumed to the State of Pennsylvania upon its purchase, and although I have not been so authorized as yet, I am certain that I can get the authority at any moment to give away this canal and all its appurtenances for nothing to this plaintiff or any other party who will give satisfactory indemnity to protect the stockholders from their obligations.

HARRISBURG, PA., *February* 17, 1882.

Depositions of Witnesses Produced and Examined on the Part of Complainants Before Charles Howson, Master.

Present: J. J. Coombs, Esq., for the complainant; S. S. Hollingsworth, Esq., for respondent.

SOLOMON R. SHIPE, being duly sworn, deposes as follows in answer to interrogatories propounded to him by J. J. COOMBS, Esq., counsel for complainant:

My name is Solomon R. Shipe; my age, fifty-four; Sunbury, Pennsylvania; boatman, generally, through the boating season, on the Pennsylvania canal and others connected with it. I have been in the boating business about twenty-five or twenty-six years. I own the boats I run. The boats I run now are coupled boats. I bought them from Andrew Fairman, of Middletown. They are boats something like the McCreary attachment, but the wheel runs the other way, and they have no cog-wheels. I guess I have run these coupled boats eight seasons, or very nearly.

I find on looking at a memorandum book kept by me that an entry made by me therein in October, 1878, states the rate of freight at that time by double boats from Nanticoke to Havre de Grace was sixty-five cents. I have no independent recollection of the fact apart from this entry, which, however, is one made by myself at the time.

372 (Objected to by counsel for respondents as not evidence.)

I won't be sure that this was double-boat freight; I guess it was single-boat freight, but now we come to where I know it was double-boat freight. There was one trip from Nanticoke to Harrisburg, thirty-three cents; that was double boat. That was on the 13th of May, 1879, when I loaded. I speak now from an entry in the book.

(Objection continued.)

I do not know what the single-boat freight was at that time. I know, however, there was a difference.

The freight I carried was coal. I carried the coal for the Susquehanna Coal Company, I believe they call it.

One trip I separated my boats and run them singly for the sake of getting single-boat freight. I did not continue to run them that way, because it is an unhandy way to run them. I had one boat tied behind the other with a rope; we towed one behind the other

with a long rope. To run them that way it would have taken more men and we ought to have had more teams, and they were not built to run that way. I found it better to run the boats double at double-boat freight than to run them single in that way at single-boat freight.

Generally in a single boat they have three mules; some only have two, but they ought to have three and four for a pair of double boats. With a double boat we generally boat with three hands and it requires the same number for a single boat.

Question 1. Is the use of one mule on a double boat the only additional expense over a single boat?

Answer. Well, yes; that's about the same generally. It takes a little more line; more and heavier.

Q. 2. What is the cost, as nearly as you can estimate, of an additional mule per month, say?

A. Oh, I can hardly tell. I didn't take account of that.

373 Cross-examined by S. S. HOLLINGSWORTH, Esq.:

Witness' attention is called to the page of memorandum book from which he has testified as to the rate of freight from Nanticoke to Harrisburg.

X Q. 1. Is there anything on that book to show whether that was a single or double boat?

A. No, sir.

X Q. 2. How do you know it was a double boat?

A. I know it as well as I know I am sitting on this chair. 254 tons was what I had on. It was carried on two boats coupled.

X Q. 3. What it the difference between single and double boat freight?

A. They always have a lower rate of freight on double boats then on single boats. The rate of freight is per ton and you get a less rate of freight on double boats than you would for the same number of tons carried on two single boats. The difference this last year—spring—was twenty cents per ton from Nanticoke to Havre de Grace. I only took one load last summer. It was on May 31st I left Sunbury. It was a double boat. I got, according to my recollection, sixty-four cents. The only knowledge I had as to single-boat freight was what I heard from others.

I know of no ways of coupling canal-boats other than that of McCreary and that used by the Pennsylvania Canal Company. I have never seen any others that I recollect.

Redirect:

Q. 1. You spoke of double boats using heavier and more lines than single boats. Does a pair of double boats use heavier or more lines than two single boats would?

A. It takes heavier bow and tow lines. The double boats use lines a little heavier than the single boats; whether they use more lines I hardly know, but guess not. If you want to tie up, I can tie

up my double boats with two lines or I may have three or four. Two single boats require two tow-lines.

374 Q. 2. Which would wear out the most line in given use, a pair of double boats or two single boats?

A. I wouldn't hardly know.

SOLOMON R. SHIPE.

Sworn to and subscribed before me this 17th day of February, A. D. 1882.

CHARLES HOWSON, *Master.*

SAMUEL DERR, being duly sworn, deposes as follows:

Age, forty-two years; reside at Liverpool, Pennsylvania; occupation, boatman; have been at it off and on for the last twenty-eight or thirty years. I have been using the Pennsylvania Canal Company's boats since 1872; have used coupled boats of that company; commenced to do so in 1873; have not since that used any single boats. I leased double boats in 1874 from the Pennsylvania Canal Company; ran a pair of coupled boats last season. I made a trip to Baltimore in the forepart of summer, when I remember getting seventy cents. A pair of double boats will carry more freight than two single boats. The double boats are generally larger. While paying boat rent I paid 25 per cent. rent until the last year, when I paid, I think, only 18.

Cross-examination:

The greater tonnage of the double boats does not depend entirely upon the different size of the boats; with the coupling rigging it appears we have better control of the boats; can handle them better, and that is where we have the advantage in loading them. We carry more on the double boats than we do on two single boats. We can control a pair of double boats in the canal better than we can one single boat. You can load a single boat to the same depth, but cannot handle her so successfully on the bottom as a double

375 boat when so loaded. The average capacity of a single boat is 125 tons. The average capacity of a double boat of one class is about 260 tons or a little more; that of a single boat of the same class, about 133 tons.

Re-examination:

There is rather more carried on a double boat than on two single boats of like capacity because of the greater ease with which the double boat can be handled. The photograph, "Complainant's Exhibit W," represents a pair of Pennsylvania canal double boats. I do not think that any of the said boats are rigged materially differently from what is shown in that photograph.

I believe last summer Captain Mills made several trips with one box of his double boats while he was getting the other one repaired, and I think Captain Shewer left one of his boats and made a trip with the other late in the fall about six or seven years ago, being afraid he might not be able to get through with both boats. These

are all the instances I know of or can call to mind of double boats being separated and run singly.

The rates of freight are fixed by a schedule which we boatmen find in the office of the Susquehanna Coal Company at Nanticoke when we go there at the opening of the boating season in the spring. These schedules state the rates of freight for single boats and for double boats. The single-boat freight rates are the highest.

I never knew the coal dealers—the purchasers of coal—to have anything to do with fixing the rates of freight.

The coupling and steering devices of the Pennsylvania Canal Company's double boats are made fast to, bolted on, the boats.

Recross-examination:

If this gearing were taken away there would be nothing left on one boat, the fore boat, but the hooks and blocks provided for the chain attachment. That boat could then be used as a single boat, and the only difficulty in so using the other boat would be the inconvenience arising from the presence of the wheel.

376 My statement as to the comparative quantities of freight carried by a double boat and by two single boats is derived from information from my fellow-boatmen.

(Objection by respondent's counsel to the evidence as to this matter as hearsay, and notice to strike out.)

Re-examination:

I have run two different pairs of coupled boats. The numbers of the first pair were 79 and 80; of the last, 233 and 234. I believe the boats were originally numbered consecutively, but two or three were lost and their places supplied by others, which were numbered back.

SAMUEL DERR.

Sworn to and subscribed before me this seventeenth day of February, 1882.

CHARLES HOWSON, *Master.*

DAVID SHUMAKER, being duly sworn, deposes as follows:

Age, fifty-one years; reside at Liverpool, Pennsylvania; occupation, boatman about twenty-eight years; have been running Pennsylvania Canal Company' boats since 1873, both coupled and single boats. I used a single boat first part of the season of 1873, and then, at the latter end of the season, I got a double boat; ran this pair of double boats three seasons; then run another single boat four seasons. Last season ran a double boat. I do not know whether I leased these boats from the Pennsylvania Canal Company.

The rates of freight received by me for trips from Nanticoke to Havre de Grace with double boats, one trip, and to Baltimore, two trips, in the latter part of 1873, were, for the Baltimore trips, one dollar and thirty cents, and Havre de Grace, one dollar and twenty cents. Last season I got on a double boat sixty-four cents to Havre

de Grace up to September 15th; after that seventy cents, I believe.

377 I do not know of my own knowledge what the difference in rates of freight between single and double boats has been at any time, but I know the company claimed it to be 25 per cent. The boat rents were taken off in 1878, I think. Previous to that I paid different rents; part of the time 25 per cent. and part 18 per cent. The reduction was in 1878, I think.

The difference in expense between running a double and a single boat is, I think, about $25 a month, the double boat costing that much more to run. The difference is caused by having one more mule for the double boat and using heavier and more expensive lines. We do not have as many tow-lines on a pair of double boats as on two single boats, but we do not have as many other lines.

Cross-examined:

The average tonnage of a single boat is about 125 tons. In the spring of 1877 we got a dollar a ton on single boats to Baltimore. The difference in freight rates between single and double boats is stuck up in the office at Nanticoke, the Susquehanna Coal Company's office. They state in the schedule the rate for a single and double boat. I bought a single boat from the company—an interest in it—and they were to pay me freight rates 25 per cent. more than double-boat freights. Mr. Koessler, the clerk, made this agreement with me. That is all I remember about it.

The rent I paid was 25 cents off every dollar. This was taken off at Nanticoke, the Susquehanna Coal Company's office, where we got our manifests. After they took the rent off they lowered the freight by an amount about equal to the extent of the rent taken off.

DAVID SHUMAKER.

Sworn to and subscribed before me this seventeenth day of February, 1882.

CHARLES HOWSON, *Master.*

378 PETER DERR, being duly sworn, deposes as follows:

Age, forty-seven; residence, Liverpool, Pennsylvania; occupation, boatman. I commenced for the company on the Pennsylvania Canal boats in 1876, and have used those boats from that to the present time—double boats; have had two pairs. The first pair were numbered 83 and 84; the second, 255 and 256. The coupled boats of the Pennsylvania Canal Company are, with the exception of one pair coupled by the McCreary arrangement, coupled as shown in this photograph—"Complainant's Exhibit W."

In 1876, on the first trip I had the boats, I got a dollar a ton to Delaware City, and that was the only trip I got that. After that the freights went down 25 per cent. I cannot remember the ferights paid me in subsequent years, until the last, when I got to Havre de Grace sixty-four cents and seventy cents to Baltimore or Delaware City.

I have seen the schedules in the company's office. I could not

tell you the difference in freight rates between single and double boats, but I know there was a difference. The schedule rates have changed from time to time between 1876 and the present time. The rates would be uniform until the schedule was changed.

I never negotiated or bargained with the coal dealers or purchasers about the rates of freight.

Cross-examined:

I never saw any other kind of rigging on the Pennsylvania canal than the McCreary and the Pennsylvania Company's rigging. I have seen two single boats connected together by ropes. Sometimes two boats are so connected for company's sake. I think that two boats so connected could be run at the same speed with the same number of mules as can a pair of double boats coupled by the present plan.

379 In 1876 I bought out the team and rigging belonging to another captain and then took a lease of the boat from the Pennsylvania Canal Company.

PETER DERR.

Sworn to and subscribed before me this seventeenth day of February, A. D. 1882.

CHARLES HOWSON, *Master.*

CHARLES SHELLENBERGER, being duly sworn, deposes as follows:

Age, twenty-five years; residence, Liverpool, Pennsylvania; occupation, boatman; have been running a boat for myself three years—a boat of the Pennsylvania Canal Company—a single boat. The rates of freight I have got from Nanticoke to Havre de Grace were, in 1879, sixty-eight cents; in 1880, I don't exactly remember; in 1881, eighty-five cents in the fore part of the season; in the fall there was a raise, but I did not have any boat to Havre de Grace. When the rates to Havre de Grace are raised or lowered corresponding changes are made for shorter trips. I have seen the schedule of rates put up at Nanticoke. I saw such a schedule last spring. I did not examine the double-boat rates; they did not concern me. There was a difference; single-boat freight was the highest.

Cross-examined:

I was carrying coal last fall to various places this side of Havre de Grace.

C. W. SHELLENBERGER.

Sworn to and subscribed before me this seventeenth day of February, A. D. 1882.

CHARLES HOWSON, *Master.*

T. N. FUNK, being duly sworn, deposes as follows:

380 Age, thirty-six years; residence, Liverpool, Pennsylvania; occupation, boatman. Since 1875 I have been running Pennsylvania Canal Company's boats—double boats since 1875. I ran a

single boat of the company from 1870 to 1873—spring. Then I ran a boat of my own till the spring of 1875.

I don't recollect about rates of freight except to some few points for the last three seasons: Havre de Grace, in 1879, forty-nine cents; Baltimore, fifty-six cents. I am not sure about 1880 whether the freights had advanced any or not. In 1881, Havre de Grace, sixty-four cents; fore part of the season to Baltimore, seventy cents. That is about all I know concerning the long trips.

I know Mr. Rutledge to be the agent for the Pennsylvania Canal Company. He is the agent from whom I lease the boats.

I have seen the schedules of freight rates at Nanticoke. I know there was a difference of rates between single and double boats—a difference in favor of single boats.

T. N. FUNK.

Sworn to and subscribed before me this seventeenth day of February, A. D. 1882.

CHARLES HOWSON, *Master.*

JAMES J. STAILY, being duly sworn, deposes as follows:

Age, fifty-one; residence, Liverpool, Pennsylvania; occupation, boatman; have been boating twenty-five years or more. I have been running boats of the Pennsylvania Canal Company since the year 1875 under a lease of the boats from them—double boats; the same pair; numbers 180 and 181.

I don't remember any rates of freight got by me until last year, when I got sixty-four cents to Havre de Grace and seventy cents to Delaware City. I have seen the schedules of freight rates in
381 the Susquehanna Coal Company's office, but cannot remember them more than that I noticed the rates were more for single than for double boats.

I paid boat-rent in 1875, 1876, and in 1877, I think. Twenty-five per cent. of freights earned. I think it was reduced.

JAMES J. STAILY.

Sworn to and subscribed before me this seventeenth day of February, A. D. 1882.

CHARLES HOWSON, *Master.*

D. E. SHELLENBERGER, being duly sworn, deposes as follows:

My age is thirty-two years; — Liverpool, Perry county, Pennsylvania, and my occupation is canal boatman; have been so engaged since 1858 regularly. I use a pair of boats bearing the name of the Pennsylvania Canal Company. They are numbered 79 and 80. I commenced using this pair of boats in 1880. This is the first pair I have used for myself. I have never used single boats belonging to the Pennsylvania Canal Company.

Question. 1. Can you state what is the difference in the expense of running a pair of double boats and a single boat?

Answer. The difference would be, as a general rule, one extra horse or mule more. We run them, as a general thing, with the

same amount of hands—that is, a pair of double boats with the same number of hands as one single boat.

Q. 2. What is the usual amount of coal carried by a pair of double boats per trip?

A. The boats I am running carry from 235 to 263 tons. I am running one of the smaller class of boats.

Q. 3. Are your boats under or over the average in size?

A. Medium; neither over nor under.

Q. 4. What is the average number of trips that a pair
382 of double boats make from Nanticoke to Havre de Grace during a season?

A. About nine trips.

Q. 5. Same question as to trips from Nanticoke to Baltimore.

A. I think we can make as many trips as we can to Havre de Grace. As a general thing, if we are going to Baltimore, we calculate on reaching Havre de Grace for a four o'clock tow. If the weather is not rough we get to Baltimore between five and eight o'clock in the morning, ready to discharge cargo, if the consignee is ready for us.

Q. 6. What rate do you get to Havre de Grace and what to Baltimore?

A. Last year, from about the fifth of April to about September 1st, we got seventy cents to Baltimore; sixty-four to Havre de Grace.

Q. 7. Who do you make the bargain with for these freights?

A. I have never made any bargain at all. They send us a schedule and we boat on that schedule of freight until it is changed.

Q. 8. Look at photograph marked Exhibit "W" in this case and say what it represents.

A. That represents the hind end of the fore boat and the fore end of the hind boat of a pair of Pennsylvania Canal Company's double boats—at least the name is on. I think I have seen most, if not all, of that company's double boats.

Q. 9. State whether those you have seen are all coupled substantially alike, and, if not, what difference there is in them.

A. The only difference some have the blocks set on the outer edge of the boat, while some have them set back a few inches towards the centre of the deck.

Q. 10. Are the boats of the Pennsylvania Canal Company having this coupling rigging on them, so far as you know, ever run separate or singly? I mean for a whole trip.

383 A. I never run mine singly. I believe I saw one so run last summer. William Mills was running it. He did not run it the whole season that way. I only know of his doing so for two or three trips. I think one of his boats had sunk and he took it to the dry-dock.

Q. 11. Do you know what the rate of freight was on single boats at the time you have spoken of?

A. I do not know. I sign a contract when I lease my boats. I do not keep a copy of it. The man, Mr. Kressler, always hands me the lease to sign and takes it back and keeps it.

Q. 12. How are the freights paid to you?

A. We get a certain amount in advance when we load. The waymaster at Beach Haven, Mr. Mixell, pays it to us. He gives us our clearance to pass us through the Pennsylvania canal. I would infer that he was employed by that company or the company that claims to own the canal. The consignee pays us a certain amount of the balance. We get the balance as back freight at Nanticoke. The shipping clerk pays us that. I cannot produce a manifest, because when we get the back freight the manifest is lifted.

Cross-examined:

X Q. 1. Is there any difficulty in taking the rigging, as shown in that photograph, off?

A. By throwing the chains off the claw-hooks the boats could be separated and run single, but the rigging would be somewhat in the way, especially on the hind boat.

X Q. 2. You do not know, do you, that these coupled boats are not sometimes run single?

A. I only know of that having been done in the one case I have mentioned of the boat sinking and being taken to the dry-dock.

X Q. 3. You cannot say, can you, that these boats with the coupling rigging are never used singly?

A. My answer is as before. I never knew them to be used singly except in the one instance I have mentioned. They might be so used and I not know it.

384 X Q. 4. You say the average tonnage is from 235 to 263?

A. There are only a few pairs of boats which carry less than mine do.

X Q. 5. The average tonnage being what you say, do the boats always run with a full cargo?

—. They do—all the double boats. That I say of my own knowledge. A full cargo for one point does not always make a full cargo for another. 235 tons was the smallest load I ever carried, and 263 tons the largest. Some of the boats may carry less than 235 tons. I am not supposed to know what another man carries. I only answer for myself, not for others.

The load of 235 tons which I carried was to the lowest point in the canal I ever went to.

The number of trips which I have given as the average to Havre de Grace is not always made. Less may be made in some cases. If the parties do not employ us the whole season we do not work. A boat might make less than nine and might make ten trips a season. Perhaps one man may have to lay off during the season. I say we can make more than nine trips a season, but are not allowed to do so to Baltimore. I made thirteen trips with a double boat, but not to Baltimore. I do not undertake to say that all the double boats of the Pennsylvania Canal Company make nine trips a season. I speak only for myself and my own boats.

Re-examination:

Q. 1. What part of the canal is it that the boats cannot run fully loaded?

A. The lower portion of the Juniata. Coupled boats often run on that part of the canal. Even on that part of the canal you can run 235 tons. That is the smallest load I ever carried.

Q. 2. Do you know the rate of freights that was paid in 1874, and subsequent years, on single and double boats?

385 A. I did know at one time by having it in a memorandum.

D. E. SHELLENBERGER.

Sworn to and subscribed before me this seventeenth day of February, 1882.

CHARLES HOWSON, *Master.*

WILLIAM E. PORTZLINE, being duly sworn, deposes as follows:

My age is forty-five; reside at Liverpool, Pennsylvania, and my occupation is a boatman. I have boated about twenty-eight years. I use the boats of the Pennsylvania Canal Company, and I have done so for eight or nine years. I have run their double boats for nine seasons. I have the second pair now; the first pair are run yet by another party. The numbers of the boats I now run are 245 and 246; the numbers of the first pair I run were 158 and 159. The boats are numbered pretty much consecutively; there have been some lost and replaced by new boats bearing the same numbers. I was using a pair of double boats in 1874. The first rate of freight we got to Havre de Grace was one dollar. Freight has varied so much since that I have no run of it. During the season of 1874 the freight was raised ten cents. I don't know what rates of freight were paid to single boats that season. I think they were paid more than double boats. I think about 25 per cent. They reduced the freight some time after that, and double boat and single-boat freights were equal for a time—that is, single boats not owned by the company. I could not exactly tell about the single boats owned by the company. I think this equality of freights continued but one season; somewhere about 1878.

I think it was in 1878, it may have been before that, that the boat rents of the Pennsylvania Canal Company's boats were
386 thrown off. The last rate of boat rent for the last year or two we paid it was 18 per cent. on the dollar of freight; before that it was 25 per cent. I cannot tell the year the change was made. I think the reduction was before the beginning of 1878, but am not sure.

The usual tonnage of coal carried by double boats, on five-foot boats, will average about 250 tons. Some five-foot boats will carry more, as high as 270 tons, while some will not carry 250. There are two pairs, I think, which will not carry 225 tons. I think 250 tons is a fair average.

The difference of expense in running a pair of double boats and one single boat is, if they are to run at the same speed, the double

boats will take just double the stock of mules; but that is not double the expense, for we have not double the hands. We do not require more hands, but we pay those we have a little more wages.

The pair of boats I commenced running in 1874 were numbered 158 and 159.

I have examined the photograph, Complainant's "Exhibit W," and find it to represent a pair of Pennsylvania Canal Company's double boats. There is one pair of the company's double boats rigged materially differently from this photograph. That pair has McCreary's rigging, and is run by one Keller. With the exception of that one pair, there is none of the company's double boats rigged materially differently from this photograph, and I have seen all their boats. I should have said that there is one pair in which the steering rigging is on the front instead of the hind boat, just the reverse of what this photograph shows.

I have known some of the company's double boats to be separated and make trips single. Number 123, one fall, left the bow boat home and made a trip singly. I have known several other cases in which, late in the fall, one of — boats has made a trip single. 138 or 139 did so. Of the same boats one was left at the dry-dock and the other made several trips single. I have known one of a pair of coupled boats to be sent to Harrisburg and the other to Columbia, but that is not often the case. They came to Harrisburg to-
387 gether and were then separated. In returning they were coupled together at Harrisburg again, and went back together. We average about a trip a month from Nanticoke to Havre de Grace or Baltimore and return, and the boating season is about eight months.

Cross-examined:

All the boats accomplish eight trips, on the average, a season, unless they be laid up for repairs; that is about the amount of work they can do in a season when employed, and they are all employed unless undergoing repairs. Some are laid up six, eight, or nine weeks for repairs. I have seen as many as a dozen pairs under repairs at one time. As a general thing, there are that many there for repairs. I speak of my own knowledge when I say that all the boats not undergoing repairs are employed. The five-foot double boats often carry less and often carry more than 250 tons, on the average. I do not mean to say, as of my own knowledge, that all the five-foot boats of the Pennsylvania Canal Company do actually carry as much coal during a season as will make the average carried by them 250 tons each. The average of 250 tons I believe to be correct, as applied to boats running down to Havre de Grace and Baltimore, while the average carried up the Juniata will not be more than 225 tons. I can tell how many double boats of five-foot draft carried coal from Nanticoke to Havre de Grace or any other place during the season of 1874. I don't know what the average tonnage shipped by the company during 1874 was, nor the average tonnage shipped upon five-foot double boats during that season, nor as to the seasons of 1875, 1876, or any other season.

Redirect:

Q. In stating that the average tonnage of double boats from Nanticoke to Havre de Grace or Baltimore was 250 tons, did you intend to say that you had actual personal knowledge or did you give it as an estimate?

A. As an estimate.

(Counsel for respondents objects to evidence purporting to be simply matter of estimate.)

Recross-examination:

388 *Q.* I base my estimate thus: The new boats which the company has built are a little larger and fuller, and carry about 270 tons. I have had a pair of the smaller class boats too, and they will carry 250 tons. That is the way I get at my estimate. It is not likely that a man would go down the canal and not carry what he could carry. That is what the boats will carry, and, I suppose, do carry.

WILLIAM H. PORTZLINE.

Sworn to and subscribed before me this seventeenth day of February, 1882.

CHARLES HOWSON, *Master.*

DAVID O. RITTER, being duly sworn, deposes as follows:

My age is forty-three; Liverpool, Pennsylvania; boatman in the summer season; have been in the business off and on for twenty-two years. I have boated with the Pennsylvania Canal Company's boats for about nine years. I lease them from the Pennsylvania Canal Company. I have used the coupled boats ever since they have been in use by the company. I have examined the photograph, "Complainant's Exhibit W," and I take that to be the apparatus now used for connecting two single boats by the Pennsylvania Canal Company.

Question 1. I suppose you have seen most of the boats used by the Pennsylvania Canal Company in the canal?

Answer. Yes.

Q. 2. Please say whether or not their coupled boats are all coupled by rigging like that shown by the photograph.

A. They are, as far as I have any knowledge. I ran a pair of such boats, numbers 198 and 199.

Q. 3. State whether the rigging that constitutes the coupling and steering apparatus on their coupled boats is permanently affixed to the boats.

389 A. It is a permanent arrangement, as far as I know. Of course, it has been undergoing some improvements.

Q. 4. Are not their coupled boats all coupled and steered substantially alike?

(Objected to and withdrawn.)

Q. 5. State whether there is any, and, if any, what, substantial

difference in the coupling and steering rigging of the boats of the Pennsylvania Canal Company.

A. There is no difference in the coupling arrangement from the time they first coupled them. Only they have been making some improvements in the different blocks used—enlarging them and changing their position.

Q. 6. Has there been any material, and, if so, what, changes in the location of these blocks; and, if so, when were they made?

A. As regards any specified time, I don't know when they were made. The change that I have reference to is making the block larger and changing its position from an inner to an outer position.

Q. 7. Have you, since the coupled boats were put upon the canal, ever run single boats?

A. No, sir.

Q. 8. Can you give the difference in freights on single and double boats from 1874 down to the present time, or any part of that time?

A. Indeed, I cannot. I was not interested in single boats and took no note of the rates of freight on them. We received in the spring of 1881, up to a certain time—I could not give you dates; either in September or October, I don't know which—sixty-four cents to Havre de Grace, seventy to Baltimore, sixty-four cents to Delaware City. In September or October we received an advance of 10 per cent. on the amount per ton. This was on double boats.

Q. 9. What is the usual amount carried on a pair of double boats?

A. They vary considerably. They carry from 245 to 275 tons when fully loaded.

390 Q. 10. Are boats usually run fully or only partly loaded?

A. Well, generally pretty well loaded.

Q. 11. Do you ever make a trip with less, say, than 240 tons?

A. No, sir; I don't in the boats I have gotten.

Q. 12. About what number of trips would a pair of boats make in one boating season from Nanticoke to Havre de Grace?

A. Considerable depends upon the delay down below; from eight to ten trips.

Q. 13. If they run to Baltimore, about how many trips would they make in the season?

A. I suppose about eight trips.

Q. 14. Does a pair of coupled boats carry twice as much as a single boat? I speak of the boats used in the Pennsylvania canal.

A. A few of the single boats will carry as much as one of the double boats, but a good many will not.

Q. 15. Are the coupled boats—that is, the boats having the coupling rigging of the Pennsylvania Canal Company—ever employed to make trips as single boats?

A. As regards myself, I have never done so down-stream, and but once up with a cargo not coal. Coal is carried upstream, but not the particular coal we load at Nanticoke. They carry coal up the West Branch, but no double boats go up there that I know of.

Q. 16. You say you have never run your coupled boats singly

down-stream. Do you know of any other lessees of coupled boats doing so; and, if yes, to what extent?

A. I don't know of any particular persons having done so.

Q. 17. From whom do you lease your boats?

A. I have leased mine from Mr. Rutledge, agent of the company that we boat for. There are different opinions as to the company we boat for. I do not know what company Mr. Rutledge is agent for.

391 Q. 18. When leasing a boat or pair of boats is there a written or printed and written contract signed?

A. There is.

Q. 19. Who prepares it?

A. I cannot answer that question.

Q. 20. Who presents it to you for your signature?

A. It has always been presented to me by Mr. Kressler, a clerk—clerk for Mr. Rutledge—that is, as far as I know. I do not keep a copy of the lease I get. It is a printed blank filled up in writing.

Q. 21. What is the rate of boat rent that you pay?

(Objected to, as contract is best evidence of its contents.)

A. Nothing at all.

Q. 22. How long since you ceased to pay boat rent?

A. I cannot answer definitely.

Q. 23. Did you pay any in 1879?

A. I cannot answer that question. I have these things all down in a memorandum, but I did not bring that with me.

Q. 24. Can you remember whether you paid any boat rent in 1878?

A. I cannot.

Q. 25. Have you paid boat rents at any time since using the company's boat?

A. Yes, sir; I paid from 20 to 25 per cent. on the dollar of freights earned.

Q. 26. How were those boat rents paid?

A. Generally by deducting the amount from back freight.

Q. 27. Do you mean when the freight was paid the rent was deducted?

A. Yes.

Cross-examined:

The consignee paid a portion of the freights, the shipper a portion of it. In the first place we receive a certain amount of advance freight on receiving our manifests, then a specified amount

392 that we receive from the consignee, and on returning to Nanticoke with the light boats we receive the remainder from the shipping clerk. I would not say that others take less loads than I did, but I think I am safe in saying that they sometimes take less than 245 tons. I have not seen any manifest or papers and showing less than 240 tons. My boats are of the larger size, carry a load of from 260 to 278 tons, and I have had on them as high as 280; but there are smaller boats, which do not carry so much.

X Q. While these coupled boats can carry from 240 to 275 tons per pair, do they not sometimes carry less?

A. Yes, sir.

X Q. While these double boats can make from eight to ten trips in the season to Havre de Grace, and, say, ten trips to Baltimore, do they not sometimes make fewer trips?

A. Yes, sir; some of them.

X Q. Do you know of any other mode of coupling boats than that used by the Pennsylvania Canal Company or the rigging of McCreary?

A. No, sir.

Redirect:

Q. Did you ever know of any pair of double boats carrying less than 240 tons on the main part of the canal?

Question withdrawn.

D. O. RITTER.

Sworn to and subscribed before me this seventeenth day of February, 1882.

CHARLES HOWSON, *Master.*

HARRISBURG, SATURDAY, *February* 18, 1882.

Captain F. P. BEIGH called, sworn.

Direct examination by Mr. B. COOMBS:

WITNESS: My age is twenty-nine; occupation, boatman; residence, Liverpool.

393 Question. How long have you been a boatman?

Answer. That I don't know right myself. It has been a good while, though; ever since I could crawl on a mule.

Q. Say about how long.

A. I couldn't just tell you that.

Q. Is it more than fifteen years?

A. I went on, I think, when I was ten years old, and I am twenty-nine years now.

Q. More than fifteen years?

A. No; I don't think I have.

Q. More than ten years?

A. Yes; I think I have.

Q. Have you been boating on the Pennsylvania canal?

A. Yes, sir.

Q. Have you been using the boats of the Pennsylvania Canal Company?

A. Yes, sir.

Q. How long since you have been using their boats?

A. Since 1876.

Q. During that year, too?

A. Yes, sir.

Q. What did you run—double or single boats?

A. I have run single boats, and I run double boats now.

Q. How long did you run a single boat?
A. Until last September.
Q. From 1876 until——
A. Last September.
Q. What is the rate of freight you got for carrying coal on your single boat? And, if it varied, state how much you got each year.
A. That I couldn't tell. I have not marked that down. I have forgotten it.
Q. Couldn't you tell what you got any year?
A. I could tell you what I got last year.
Q. When you were running a single boat?
A. Last year I had a single boat, too.
Q. What did you get then?
A. I really couldn't tell what I got for a single boat.
394 Some points I can tell you. I got eighty-five cents to Havre de Grace.
Q. Last year?
A. That was last year. I got fifty-two cents to Harrisburg on the single boat. I don't mind any more outside of that.
Q. From Nanticoke, I suppose.
A. Yes, sir.
Q. What freight did you get on your double boats after you commenced using them?
A. I only had three loads on her. I got forty-two to Ohio Wharf and seventy-seven to Delaware City.
Q. Were they run up the Juniata?
A. Yes, sir.
Q. Did you make any trips to Havre de Grace on that boat?
A. No, sir.
Q. To Harrisburg?
A. No, sir.
Q. To what point?
A. To Delaware City.
Q. What did you get to Delaware City?
A. Seventy-seven cents.
Q. What is the usual difference between freight to Havre de Grace and to Delaware City?
A. That I don't know.

T. S. BEALOR called, sworn.

Direct examination by Mr. COOMBS:

Question. State your age, residence, and occupation.
Answer. Twenty-four years old; Harrisburg; boatman.
Q. How long have you been a boatman?
A. Well, in the neighborhood of about thirteen years.
Q. Have you boated on the Pennsylvania canal?
A. I have.
Q. Have you used the boats of the Pennsylvania Canal Company?

395 A. I have.

Q. How long have you been using their boats?

A. One summer.

Q. This last summer?

A. Yes, sir.

Q. Did you run double or single boat?

A. Single boat.

Q. What rate of freight did you get for a single boat during the last season?

A. Well, in the fore part of the summer I got eighty-five cents to Havre de Grace and ninety-three cents to Delaware City.

Q. Do you know what double boats got during that time?

A. No; I couldn't say.

JOHN R. BOYLE called, sworn.

Direct examination by Mr. COOMBS:

WITNESS: Residence, Harrisburg; age, forty-five; occupation, boatman.

Question. How long have you been a boatman?

Answer. About twenty-six years.

Q. Boatman on the Pennsylvania canal?

A. Yes, sir.

Q. Have you been using the boats of the Pennsylvania Canal Company?

A. Yes, sir.

Q. How long have you used them?

A. Very near four years.

Q. Have you used double or single boats?

A. I used a single boat three seasons.

Q. What three seasons were they?

A. 1878, 1879, and 1880.

Q. What rate of freight did you get on the single boats during those years?

A. I cannot call to memory the freights that existed in 1878 and 1879, but can part of those existing in 1880.

396 Q. State all you can remember.

A. To Havre de Grace I got seventy-eight cents.

Q. In what year was that?

A. 1880; and to Harrisburg I got fifty-two cents.

Q. Did you ever carry any coal to Baltimore or Delaware City?

A. I carried coal to both of those places on the single boat, but don't remember the freights.

Q. Can you remember what you got any other year except 1880?

A. Previous to that?

Q. Can you remember what you got any other year except 1880?

A. Not with the exception of last year.

Q. What did you get in 1881?

A. I got seventy cents to Baltimore and seventy cents to Delaware City.

Q. Was that on a single or double boat?

A. Double boat.
Q. In 1880 it was on a single boat?
A. Yes, sir.
Q. You didn't run any single boat last season?
A. No, sir.
Q. State whether you know of a difference in double and single boat freights any time that you have been boating.
A. Yes, sir; I know there has always been a difference existing between the two classes of boats ever since I have been running a company boat.
Q. Do you know what that difference was at different times?
A. No, sir; I don't.
Q. Single boats got the most?
A. Yes, sir.

397 ANDREW E. FAIRMAN called, affirmed.

Direct examination by Mr. COOMBS:

Q. State your age, residence, and occupation.
A. My age is forty-three years the first of last May; residence, Middletown; occupation at present, carpenter; I have been a boatman for twenty-one years.
Q. Have you used boats of the Pennsylvania Canal Company?
A. I never used boats of the Pennsylvania Canal Company. I have boated on the Pennsylvania canal, but had a boat of my own.
Q. What was that—single or double boat?
A. Double and single boat both.
Q. During what time did you use a single boat?
A. From 1861 up to 1870.
Q. What rate of freight did you get since you have used the double boats?
A. Having my own boats, I got single-boat freight all the time. No difference made all the time I boated.
Q. You know there was a difference so far as the company's boats were concerned?
A. I knew there was a difference, but what it was I couldn't tell.
Q. Don't you know the difference any year?
A. No; I couldn't say.
Q. Have you a list of the double boats and coupled boats of the Pennsylvania Canal Company on the canal?
A. I have (producing a book).
Q. State how you obtained that list.
A. I got it by travelling along the canal from one end to the other, taking every boat.
Q. You think you have a full list of all the boats?
A. I think I have a full list of all.
Q. How many are there?
A. One hundred pair.
Q. Have you that list with you?
398 A. I have it with me. Another man and I took together a list of their boats. I took a separate list myself. I went to Nanticoke and got those.

Q. Did you see all the boats that are down on this list?

A. No; there are three pair I didn't see. I knew them to be running, but didn't see them that trip.

Q. You have seen them at other times?

A. Yes, sir.

Q. Look at that photograph and see if you understand what it is (handing to witness).

A. Yes, sir.

Q. I will ask you if all these hundred pairs were coupled and rigged similarly to that photograph.

A. Well, I think there is one that is not coupled with a crossed chain, I believe.

Q. How in regard to the rest of them?

A. They are all coupled with crossed chains; all the crossed chains crossed at the stern of the boat.

Q. Do you mean they all have the same rigging as represented there?

A. No; they are not exactly the same. In theory I guess they are the same; the boats steer on the same principle. I think the boat that was built at Dauphin is not exactly like yours.

Q. What is the difference?

A. It has a part of Mr. McCreary's plan, if I mistake not.

Q. With the exception of that one it has been already stated here that there is not one not rigged in the same way. Are these boats all rigged substantially alike?

A. All rigged alike.

Q. And in the manner represented in this photograph?

A. In the manner represented in that photograph; yes.

Q. All except one pair?

A. All except one pair.

Q. That one pair you say has the McCreary rigging?

A. Well—I—yes; I say it has the McCreary rigging.

Q. Do you know the history of that boat; how it has been with it?

399 A. No; I don't know anything about it.

By Mr. McCREARY:

Q. He is asking the question of the boat you sold.

A. Yes, sir; the Pennsylvania Canal boat.

Mr. McCREARY to counsel: He owns it himself; he tells you so.

By Mr. COOMBS:

Q. This one that you say has the McCreary rigging, does that belong to the Pennsylvania Canal Company?

A. Yes, sir.

Q. That is one of the hundred pair?

A. (A nod.)

Q. Now, point out in that book what boats you refer to that you took the list of.

A. I can't tell you.

Q. That you and the other man took the list of. There are two places, you see (referring to it by pages).

(Book objected to.)

WITNESS: I guess I might recall what I said about the Dauphin boat. I am not really positive on that about it having McCreary's rigging. I wouldn't like to say positively that it is really so. I may be at fault.

Q. State whether the book that you produced contains the list of the boats of that company taken down by you.

(Objected to. If the book does contain the list the best evidence is the book; that it is not proper to testify what is in the book.)

(Offered to identify this book as containing the list before it is competent to put it in evidence.)

(Objected to explaining what is in the book when the book is not in evidence.)

(After argument.)

The MASTER: I will let the witness answer the question, reserving the objection.

(Objection stated in form, by request, as follows:)

(Objected to (1) because the book is the best evidence of its own contents if it is offered as evidence of what in contains; (2) that until the book is offered in evidence no witness can be examined to explain its contents; (3) because the question is improperly leading.)

400

Q. State whether the book that you produced contains the list of the boats of that company taken down by you.

A. It does.

By Mr. COOMBS:

Q. What do the figures in that book, on pages 1 to 5, at the beginning of the book, and on pages 6 to 7, on the other side of the book, represent?

A. From 1 to 5 represents boats taken down by myself and another man.

(The same objection, and the question and answer admitted reserving the objection.)

Q. Who is the other man?

A. Mr. Lewis, of New York; and on pages 6 and 7 represent boats taken down by myself at Nanticoke.

Q. Have you ever known the boats of the Pennsylvania Company having this rigging represented in the photograph to be out separate and running single or making trips singly; and, if so, how many cases of that kind have you known?

A. I don't k-ow of any.

Q. Have you been familiar with the business of the canal?

A. I have. Well, four years I ran a double boat, and I lived in Havre de Grace for seven years, and I had occasion here to see

myself all the boats. I lived right along the water. The boats principally unloaded at Havre de Grace and Baltimore and Delaware City, and I never knew one to run single, except two or three cases, where one part had been sunk in the bay.

Q. How many cases?

A. Only one sunk in one storm that I know of.

(Book referred to by witness offered in evidence, marked "Complainant's Exhibit Fairman Memorandum Book.")

(Book objected to as a writing made by a witness not in the
401 presence of either party for his own information, and is not evidence against us here in any way whatsoever.)

The MASTER: The book is admitted, reserving the objection.

By Mr. COOMBS:

Q. At what time did you make this list?

A. In October, 1881.

Q. An- I think you stated that you went the whole length of the canal?

A. The whole length of the canal from *from* Nanticoke to Havre de Grace, and even to Baltimore.

Q. In order to examine these boats?

A. Yes, sir.

Cross-examination by Mr. HOLLINGSWORTH:

Q. At whose instance did you make this examination in October, 1881?

A. Mr. McCreary employed me.

Q. What did he employ you to do?

A. To get a list of the number of boats coupled together.

Q. Did you make this list entirely yourself?

A. No; with the assistance of another man.

Q. What was the character of the assistance he rendered?

A. As a boatman—him and I in order to make the thing secure, and know I really had all; we worked together.

Q. Did you see all the boats yourself?

A. With the exception of a few pair. I have saw them, but I didn't see them on that trip, but knew they were on the canal.

Q. How did you know they were on the canal?

A. I saw them since.

Q. How do you know they were on the canal in October, 1881?

A. I have seen them since and before.

Q. How many pairs of boats did you see yourself altogether?
402 A. At the time?

Q. Yes.

A. Well, with the exception of three or four—I cannot say which—I saw them all—100.

Q. Were they all in service?

A. They were all in service.

Q. Tell me when you saw them.

A. I can't tell you that.

Q. Tell me as definitely as you can.

A. Between Havre de Grace and Nanticoke also, and some of them at Nanticoke.

Q. How many did you see at Nanticoke?

A. The back part of that or part of that book will tell you.

Q. Do you know how many at Nanticoke?

A. There were too many boats; I would have to examine that list.

Q. Do you know how many were in service?

A. They were all in service; they were loaded, loading, or waiting to be loaded; waiting for a load we call in service.

Q. How do you know they were waiting for a load?

A. They were lying at the chutes and were loaded and came down afterwards.

Q. In every case you saw them coming down afterwards with a load?

A. Not in every case. I have been a boatman for twenty-one years, and I know the boatmen don't go there unless to wait for a load.

Q. They always get a load when waiting for a load?

A. Company's boats, I believe, always do, unless an accident happens. Of course, that is taken into consideration.

Q. You are quite sure there were 100 boats in actual service, are you?

A. Yes, sir.

403 Q. What was the assistance rendered to you by Mr. Lewis when you saw all the boats? Did he look at them, too?

A. Of course; he looked at them to be sure the numbers were right.

Q. You had a man along to look at them?

A. To get the numbers right we looked at them. There were two of us. I went up on his boat, and he assisted me to get the numbers.

Q. How did he assist you to get the numbers?

A. He called my attention whenever a boat passed; if I was down in the cabin he would call me.

Q. Then he took some of them down, and not yourself?

A. I marked them all down to have a list of them.

Q. And he kept a separate list?

A. Yes, sir; and we copied them off into a book.

Q. He kept a separate list?

A. I don't know whether he did.

Q. Did he keep any list?

A. I can't answer that; he must answer for himself.

Q. You have said already he marked them down. Where did he mark them down?

A. He will answer for himself.

Q. You said he marked them down. Why did he mark them down?

A. I can't answer for him. Anything I have done I will answer to.

Q. You have said he marked them down. Do you take that back?

A. I know I saw him mark some down.
Q. On what?
A. On a card.
Q. Have you ever seen that card since?
A. No; not since.
Q. Do you know what he did with that card?
A. No, sir; I don't know.
Q. Where did you mark them down?
A. On a card, and then transferred them in the evening.
404 Q. And then this book is not what you originally marked them down in; it is not the original book?
A. Yes; that is the book.
Q. You didn't first mark them down in that book?
A. No; I didn't; I marked them down and transferred them into the book.
Q. Then you didn't mark them in the book first?
A. No; I marked them down on a card and transferred them into the book.
Q. Both from his card and your card?
A. Into the book.
Q. Did you make the entries?
A. I read them off, what I had.
Q. Did you not make all the entries in that book?
A. I made all the entries into that book.
Q. Did you make all the entries in that book?
A. Yes; Mr. Lewis entered the entries and not myself. I called them off and he wrote them down.
Q. And you didn't make any of the entries in that book?
A. Not one.
Q. Do you know what those entries were made from in that book?
A. From the boats.
Q. How were those entries in that book made from the boats?
A. I took them on a card and read them off to him, and he wrote them down.
Q. What he wrote down in that book is what you read off the card?
A. Yes, sir.
Q. Did you ever compare what was read off and written in that book?
A. Yes.
Q. How did you compare them?
A. One read from the card and the other looked in the book.
Q. Did you read from both cards?
405 A. Only from my own cards.
Q. Not from his card?
A. No, sir. It contains just what I told you. What I read from the cards he wrote or transferred into the book.
Q. What did you read?
A. The number of the boat.
Q. From what?
A. The cards I put the boats on.

Q. And only from the cards the numbers of the boats which you took yourself?

A. That's all.

Q. What was done with the cards he took?

A. I don't know.

Q. Did you ever see them?

A. I saw them.

Q. When?

A. When I was along the canal last October.

Q. When was this list made in this book?

A. Every day—every evening.

Q. And when it was made wouldn't he have his cards there as well as yours?

A. Yes, sir.

Q. And they were both consulted, were they not?

A. Yes; we consulted.

Q. So this book is made up by him from numbers given by you upon consultation of cards upon which the numbers were put down and from which the numbers were put down by him. Am I right in that?

A. I just read off and he just marked them down off my cards.

Q. He did? Then when you had read them off you consulted the cards you made and the cards he made?

A. Yes; we simply read them from the cards.

Redirect examination by Mr. COOMBS:

Q. Are you sure that you saw on that trip full one hundred pairs of coupled boats, with the exception of the two or three that you mentioned you didn't see on that trip?

406 & 407 A. Yes, sir.

Q. And are you sure that the numbers put down in the book are the correct numbers of the boats you saw?

A. To the best of my knowledge they are correct.

Q. Now, when Mr. Lewis kept a separate card the same boats that he had the numbers on his card were on yours also that you had taken down yourself?

A. Yes, sir.

Q. Duplicates in that case?

A. Duplicates.

Q. Were those boats all labeled with the name of the Pennsylvania canal?

A. All labeled with the Pennsylvania canal.

Recross-examination by Mr. HOLLINGSWORTH:

Q. How do you know that the numbers on his cards were the same as on your cards?

A. By comparing.

Q. You have a distinct recollection that there was no difference in the numbers taken down by you on the two cards?

A. If there was any difference—I am not satisfied there was, but if there was we would have ferreted it out and made it right.

Q. Did you have occasion to ferret it out?

A. No. Once we had a little dispute, and settled that at the collector's office, and found out the list was right.

Q. Did your list cover all the double boats on the canal at that time? Did you take all that list except the two or three you have spoken of?

A. Yes, sir.

Q. All on your cards, I mean.

A. Yes; all.

Q. You took down yourself 97 double boats of the 100.

A. I wouldn't say whether 97 or 96.

Q. I don't mean that—95 or '6 or '7.

A. Yes.

Q. You saw at least 95 double-pair boats yourself?

408 A. I really saw them.

Q. You took down the numbers yourself on cards?

A. I took them all down.

Q. Independent of Mr. Lewis?

A. Yes, sir.

Q. Without any information given you by him to enable you to put them down?

A. No; I don't know; I couldn't say positive in regard to that. He might have called my attention to some.

Q. Did you see them yourself and see the numbers?

A. I saw all of them.

Redirect examination by Mr. COOMBS:

Q. I see in this list in the book, opposite a good many of the numbers of the boats, the names—what do those names indicate?

A. The captain of the boat, all that I knew, and those I didn't know I didn't mark.

D. E. SHELLENBERGER recalled.

Direct examination by Mr. COOMBS:

Question. (The book marked "Exhibit Fairman's Memorandum Book" handed witness.) Where you see in the list of names a blank, state whether you can give the name of the captain of each boat whose name is not down there; if not, as near as you can. Give the numbers and then state the names of the captains.

Answer. The first one on the list is 74 and 75, R. Recoff.

Q. That is down on the book—only the blanks?

A. Only the blanks.

(Objected to, calling the witness to read the contents of this book.)

The MASTER: The witness is to give, as far as he can, the names of the captains.

WITNESS: The first one on the list that has no name on the end of the numbers is 122 and 123, which is Captain Wentzel.

409 By Mr. HOLLINGSWORTH:

Q. You know he is the captain of that boat?

A. Yes, sir.

Q. Now?

A. Yes; John Wentzel. 136 and 137 is John Keller.

Q. Can you give the residence as you go along?

A. Wentzel's, Liverpool, Perry county; Keller, Port Treverton; 108 and 108, Captain James Mills, Lime Ridge, as we call it. The next one is 68 and 69, which is Jacob Reese. He lives on his boat; formerly from Milton, but he has been making his home on his boat. The next one is 117 and 116, which is George Newman, McKee's Half Falls. The next is 150 and 151, William Bretz, from Newport. The next one is 166 and 167, Jack Stroh, from Port Treverton. The next one is 128 and 129, which is Amos Gruver, from Stonytown. The next is 73 and 72, Franklin P. Beigh, from Liverpool. The next one is No. 40 and 43; belongs to a party that have a line of several pairs running—men by the name of Weaver & McKelvy. They employ captains to run for them.

By Mr. HOLLINGSWORTH:

Q. Where does McKelvy live?

A. Bloomsburg. The next pair I see here marked is 214, but it is not correct. 214 and 215 is marked to William Woolever, Danville. It is Jacob Sholly, Port Treverton; 158 and 159 is William Woolever, Danville; 25 and 24 is Henry Hentzelman, from Stonytown; 176 and 177 is Manasses Molly, from Beach Haven; 88 and 89 is Phil. Ruch, from Berwick; 168 and 169, Jacob Sheiner, of Beach Haven; 219 and 220, Ras. Baker, Espytown; 46 and 45—I can't give you the man's name; he lives at McKee's Half Falls, but I have forgotten his name; 114 and 115, Harry Toomey, from Marietta; 39 and 42 is one of those Weaver and McKelvy boats, Bloomsburg. The 38 and 41 belongs to Mulner, Port Treverton—we call him "Tuck;" 210 and 211, Hezekiah Boone, Stonytown; 249 and 250, Thomas Kane, Stonytown; 172 and 171, Richard Thornton, Lime Ridge; 83 and 84, a man by the name of Meyer, from 410 Chapman. I don't remember what his first name is; just the last name; 184 and 218, George Feltenberger, Bainbridge; 188 and 189, Moyer; I forget his first name now; residence, Chapman; 120 and 121, Thomas Elder, Newport; 261 and 262, Morris Naugle, Marietta; 124 and 125, Alfred Sheaffer, McKee's Half Falls; 251 and 252, John R. Boyle's, from Harrisburg; 81 and 82, Henry De Cartney, from Marietta; 223 and 224, Captain Coon Smothers; 257 and 258, Clint. Brobst, from. Stonytown; 227 and 228, George McClune, McCall's Ferry or Waylock, Tidewater; 192 and 193, Tillman Naugle, Lime Ridga. 140 and 141 belongs to the Weaver & McKelvy line, Bloomsburg. 196 and 197 belongs to Uriah Hearald, MeKee's Half Falls. 80 and 79 is my own, D. E. Shellenberger, Liverpool; 118 and 119, Ed. Gemberling, Selinsgrove; 188 and 189, D. O. Ritter, Liverpool; 212 and 313, Jacob Sholly, Jr., Port Treverton; 241 and 242, Samuel Housman, no residence; lives on his boat; 67 and 44, Clint. Shure, from Port Treverton; 85 and 86, Peter Shoemaker, from Liverpool; 170 and 173, Henry Naugle, Bloomsburg; 182 and 183, Edward Ginney, Selinsgrove; 90 and 91, Henry

Wilt, McKee's Half Falls; 186 and 187, Henry Carson, Espytown. 112 and 113 belongs to the Weaver & McKelvy line, Bloomsburg; 152 and 153, Joseph Mottren, Danville. That, I believe, is the contents of the book.

By Mr. COOMBS:

Q. Do you know whether all the boats that you have been testifying about are the boats of the Pennsylvania Canal Company?

A. They are labeled "Pennsylvania Canal Company."

Q. You have spoken in several instances about boats being owned by such and such parties. Do you mean leased by them?

A. They have charge of them. They are leased by them; I suppose so; at least, I have mine leased with that number.

Q. Are there any double boats numbered to lower numbers than 24 and 25?

A. Not labeled "Pennsylvania Canal Company."

411 Q. Then they are not all numbered consecutively?

(No answer.)

Cross-examination by Mr. HOLLINGSWORTH:

Q. How did you find out these captains of these various boats of which you have been speaking?

A. It is my business. I follow the canal and make it a study. I have known it for a number of years. I kept on purpose the numbers of the boats and the names of the captains. That is part of my business, or I make it my business. That is where I make my money. I have not been hired by anybody to do this.

Q. I don't mean that at all.

A. It was my own personal observation.

Q. Where do these men who live on the boats vote generally?

A. The one is a nigger. I don't think he votes at all, and the others I can't tell you.

RANDOLPH F. LEWIS called; affirmed.

Direct examination by Mr. COOMBS:

Question. What is your age?

Answer. Forty-two.

Q. Your residence?

A. Fallmouth, Lancaster county, Pennsylvania.

Q. Occupation?

A. Boatman; have been always. Of course, I followed a little business in between, but that don't make any difference.

Q. Have you boated with any of the boats of the Pennsylvania Canal Company?

A. No, sir.

Q. Did you accompany Mr. Fairman last October when he was taking the list of the company's boats?

A. Yes, sir; I accompanied Mr. Fairman in October, or rather he accompanied me.

412 Q. Look at that book and state how many of those boats on the list you examined on that trip (handing to witness)—the first five pages.

A. (After looking.) Yes, sir; those five first pages here I put them down myself; saw every number myself.

By Mr. HOLLINGSWORTH:

Q. What do you put down?

A. All these. I put them on a card. Me and Mr. Fairman first had a card of our own and put them down together and compared them afterward, and I put the boats down in the book myself as far as I had them numbered, and afterwards we took them down together, and we had to take them afterwards together to be sure they were right—the first part, I know, of the book. I wrote and he called off, and we compared the cards for every time. Of course, it was not possible to have the book right there on the moment, but for us to take them on a card.

By Mr. COOMBS:

Q. And they were transferred to the book from——

A. From the card.

Q. Are you sure those numbers are right?

A. Those five pages (after looking again); those numbers are all right, with the exception of 174 and 173—our boats—but I didn't get them, so they are crossed out, and crossed out immediately right after they were written; not afterwards. It was done immediately.

Q. All the rest you saw yourself?

A. All the rest I saw myself, and have seen often; I might almost say hundreds of times.

Q. As to the two pages in the back part of the book, marked 7 and 8, what do you know about these?

Mr. HOLLINGSWORTH: He said he wrote them down and Mr. Fairman called them off for him.

WITNESS: Those numbers—Mr. Fairman went to Nanticoke so as to be sure of the kind. They are taken by Drew. Fairman and he brought these numbers from Nanticoke to where I was, at Shickshinny, and he stopped where I was. I wasn't up there at all. He took those numbers, and to be positive there were such numbers I took them again; not at Nanticoke. I took them down in a
413 book. I got discharged below and came back and took those numbers. In 67 and 64, here they are 67 and 44 pencil-marked. Right here you will see they are crossed out. I wrote them off his card after it was written. That correction was made after we found it was a mistake.

By Mr. COOMBS:

Q. I see on page 6 the numbers written down in ink are 67 and 64, but 64 is crossed out and 44 interlined in place of it. Will you please explain?

A. I can't explain where that 64 is unless she is in the bay; I am not positive.

Q. Please explain.

A. We found that that number didn't run with that boat.

Q. That is, 64 didn't run with 67?

A. No, sir.

Q. But that 44 did?

A. Yes, sir.

Q. When was that correction made?

A. It was made after we found it was not correct. I can't just tell you.

Q. How long after the list was made?

A. That was made considerably afterwards; put after that number there. That is the only place that I interposed, with the exception where I marked out the same day I put it down from one up to five.

Q. Did you see all those boats?

A. From one up to seven, I saw all those boats, but these two pages were taken independent when I was not present, so I put them by themselves.

Q. And you put them in the book in the presence of Mr. Fairman?

A. Yes.

Q. And under his direction?

A. Under his direction.

Q. Since you have seen all these boats?

A. Yes; since and before; but that was the object to have them taken, and I seen them before I took them.

Q. You are sure they are correct?

414 A. Yes; they are correct.

Cross-examination by Mr. HOLLINGSWORTH:

Q. You saw all these?

A. I have all those cards I had at the time I put them on, but I didn't think it worth while to bring them on.

Q. Mr. Fairman has 67 and 64 going together?

A. Yes, sir.

Q. And you subsequently saw 67 and 44, and it was after you subsequently saw it that this correction was made in pencil?

A. Yes, sir.

Q. You have on the top of this "Nanticok, October 29, 1881, taken by Drew Fairman." Were you at Nanticoke?

A. No, sir; I wasn't there.

Q. You do not know, then, that that is true?

A. That is the reason I put it there. I am satisfied it was taken by a man who would be perfectly right. After that, of course, I overhauled it. We didn't take it down the time it was taken.

By the MASTER:

Q. I understand you saw the same boats afterwards?

A. I saw the same boats afterwards. I made it my business to see them.

Q. Were all those boats coupled substantially alike?

A. All, with the exception of two pair. One pair has Mr. McCreary's rigging on.

Q. I believe you stated you never ran the company's boats?

A. Yes, sir; it was the Pennsylvania company's boats. I have some boats running now, but they are the railroad company's boats. One pair has Mr. McCreary's rigging—136 and 137. One pair that is not exactly alike has the Pennsylvania rigging or their make-up; one it has on the front end of the hind boat; it is just reversed. It happened by one boat sinking in the bay and putting another to it.

Q. State whether you know whether the number of the
415 boat on which this rigging used to belong sank or was worn out.

A. I don't know of any being worn out, but several sank.

Q. How many?

A. My cards—I have every mark positive, but I can't tell you the number of them. By this book I think I can get it. Like those other witnesses, I know these men's boats and numbers; it is an every-day occurrence.

Q. I see the numbers there are not consecutive.

A. Here we put down 70 and 73. We often saw them, but I think they are sunk. Three of them I recollect of. There is the mate of the 185, sunk, but I don't know whether it has another now to it.

Q. How many boats do you remember being sunk?

A. These three I remember of. I can't be qualified to that matter.

By Mr. HOLLINGSWORTH:

Q. Do you know how long these boats have been in service?

A. From '74, to the best of my recollection.

Q. All of them?

A. No; some of them.

By Mr. COOMBS:

Q. Do you know how many of them have been in service since 1874?

A. That I couldn't tell you.

(Recess for an hour.)

HENRY ISAAC sworn.

Direct examination by Mr. COOMBS:

WITNESS: My age is fifty-three in March; my residence is Bainbridge, Lancaster county; my occupation, a hotel-keeper at the present time.

Question. Have you been a boatman?

Answer. Yes, sir.

Q. How long were you engaged as a boatman on the Pennsylvania canal?

416 A. Well, I started in as a boat-driver, and used to drive on the canal on the line-boats; boated on the Juniata and followed the occupation up, I guess, from twenty-five to thirty years. I boated on the line-boats before the railroad was built through to Pittsburg.

Q. How long since you quit that business?

A. Let me see. It will be eight years in the spring. Well, I have been off and on.

Q. Have you ever boated with the Pennsylvania Canal Company's boats?

A. Yes, sir; I boated in 1873 a pair of Pennsylvania Canal Company's boats.

Q. None since that time?

A. None since that time; no, sir; 1873 was the last that I boated.

Q. Coupled boats, were they?

A. Yes, sir.

Q. What were their numbers?

A. Numbers 37 and 38, I think it was. They were built up here at Dauphin; they were one of the first boats that came out. I had one of the first boats that they had built—double boats.

Q. What rate of freight did you get?

A. $1.25 to Baltimore.

Q. Did you make some trips to Havre de Grace?

A. Yes, sir; we made some trips to Havre de Grace. I think they paid us $1 to Havre de Grace, as near as I can tell—yes; it was $1.

Q. That is so early?

A. It was the first season we had the double boats out.

Q. Do you know anything about the rates that have been paid double and single boats since that time?

A. Not much. I have been on the canal some—that is, I have been keeping grocery along the canal at Bainbridge. I don't know so much about the rates since I have quit.

Q. Do you know whether there was a difference between the double and single boats?

A. Oh, yes; there was a difference of forty cents a ton the first year.

417 Q. What year was that?

A. That was in 1873.

Q. Do you know anything about what difference there has been at any time since then?

A. I don't know anything about it since then; there has been a difference since then.

Q. All along?

A. All along; yes, sir.

FRANKLIN FELTENBERGER called, sworn.

Direct examination by Mr. COOMBS:

WITNESS: My age is forty-six in March; occupation, that of a

boatman; that is about all I ever done—that is, for myself; residence, Bainbridge, Lancaster county.

Question. Have you ever boated with the Pennsylvania Canal Company's boats?

Answer. Yes; I have since 1876.

Q. You commenced in 1876?

A. Yes, sir.

Q. Double or single boats?

A. Double boats.

Q. And you continued to run those boats since then, have you?

A. Yes, sir.

Q. Can you tell what rate of freight you got in 1876 on the double boats?

A. Well, not exactly; no. Of course, if I had a little time—I kept an account of my expenses, and always did. Of course, having my books at home, I couldn't tell you exactly; but not here I couldn't tell you exactly. There has been so much up and down that I don't remember.

Q. Can you give the amount any year since 1876?

A. Yes; last summer a year we got sixty-four cents a ton to Baltimore.

Q. From Nanticoke?

A. From Nanticoke.

By Mr. HOLLINGSWORTH:

Q. That is 1880?

418 A. Yes, sir. Last year we got seventy cents a part of the season; a part, I think, it was seventy-seven cents a ton.

By Mr. COOMBS:

Q. Do you know what single boats were getting at the same time?

A. No, sir; they were getting some more, but I couldn't tell how much.

Q. You cannot tell how much they were getting at any time?

A. No, sir; for this reason: I had no single boat, and I did not concern myself about them freights.

BAKER KURTZ called, sworn.

Direct examination by Mr. COOMBS:

WITNESS: I am a boatman, and live at Bainbridge, Lancaster county; age, twenty-six years.

Question. Have you used the boats of the Pennsylvania Canal Company?

Answer. Yes, sir.

Q. How long have you been using them?

A. Since 1878.

Q. You commenced in 1878?

A. Yes, sir.

Q. Did you run a double or single boat?

A. Double.

Q. What rates of freight did you get from 1878 down to the present time, if they varied?

A. That is more than I could tell you. In 1878, I think, however, we got—I couldn't tell you how much it was.

Q. You couldn't tell how much any year?

A. Last year and the year before last, 64 cents—in 1880—to Delaware City or Baltimore from Nanticoke.

Q. And how much to Havre de Grace?

A. Fifty-nine cents.

Q. And that was in 1880?

A. Yes, sir.

By Mr. HOLLINGSWORTH:

Q. How much in 1881?

419 A. In 1881 I think it was the same. No; we got sixty-nine, and got a raise of seventy cents to Baltimore.

Q. Do you know what single boats were getting during any of those years?

A. No, sir.

Q. Do you know whether they got more or less than double boats?

A. They got more.

Q. You don't know how much more?

A. No, sir.

GEORGE GOTSHALL sworn.

Direct examination by Mr. COOMBS:

WITNESS: I am thirty-eight years old; residence, Middletown; occupation, boatman. I have never done anything else.

Question. Have you run boats for the Pennsylvania Canal Company?

Answer. Yes, sir.

Q. Since what time?

A. Eight years, as near as I can tell.

Q. A double boat?

A. Single boat first.

Q. How long did you run a single boat?

A. Six or seven years I had a single boat.

Q. And that comes down to what time?

A. To last year.

Q. You ran a single boat until last spring?

A. Yes; and left it there at Espy.

Q. What freights did you get in the different years, as far as you can remember?

A. I couldn't tell you that. I never kept no account.

Q. Couldn't you tell any one year?

A. No, sir. I never kept no book of it.

Q. Do you know whether you got more or less on the single boats than the double boats got?

A. Always got more with the single boat.

Q. But you cannot say how much more?
420 A. No, sir.
Q. During the last year you ran double boats?
A. Yes, sir.
Q. What freight did you get on those?
A. Got seventy cents to Baltimore and seventy to Delaware City.
Q. In the latter part of the season was there a raise?
A. Yes; this was in the latter part of the season that I got that.

GEORGE FELTENBERGER sworn.

Direct examination by Mr. COOMBS:

WITNESS: My age is forty-six; residence, Bainbridge; occupation now, in the grocery business. I have been following boating. I still have a pair of boats running.

Question. Have you used the boats of the Pennsylvania Canal Company?

Answer. Yes, sir.

Q. Since what time?
A. Well, for the last three years, up to last July.
Q. Double or single?
A. Double.
Q. What rate of freight did you get in the different years from those boats?
A. Well, I don't just recollect rightly what our freights have been. Two years ago we got sixty-four cents to Baltimore on a pair of double boats.
Q. Do you know what single boats were getting at that time?
A. I think it was ninety cents.
Q. You never ran single boats?
A. Yes, sir.
Q. You have?
A. I have.
Q. What years did you run single boats?
A. I had a single boat running up until last spring.
Q. You had a single and double boat at the same time?
A. Yes, sir; the single boat was an individual boat.
421 Q. Did you get the same freight on your single boat that you did on your double boat?
A. No, sir; I got more freight.
Q. How much more?
A. The difference between sixty-four and ninety would be about the difference.
Q. That would be twenty-six cents?

(A nod.)

Q. At what time were you getting those rates on the single and double boats?
A. Last summer a year ago.
Q. Is that the only year that you can remember?
A. Well, last summer we had a little raise of freight. I don't

know rightly what the raise was to Baltimore. I think it was a raise of ten per cent.

Q. Was there the same difference between the double and single boats?

A. I think they paid about the same difference; yes, sir.

Cross-examination by Mr. HOLLINGSWORTH:

Q. Do you know what the rate of single boats was last year?

A. No, sir; I don't know just the exact rate.

Q. Then you don't know how much more it was on single boats than double boats?

A. It was from twenty to twenty-five cents through to Baltimore.

Q. How do you know it was?

A. What I heard others say.

Q. Do you know what it was on single boats?

A. Last summer a year ago?

Q. Yes; that summer you ran a single boat?

A. Yes, sir.

Q. Do you recollect what the freight was for a single boat?

A. I don't know just exactly; but I know it was——

Q. You don't just recollect what the freight was on the single boats?

A. No, sir.

422 Redirect examination by Mr. COOMBS:

Q. What was about the difference?

A. As far as I know, from twenty to twenty-five cents a ton difference.

Recross-examination by Mr. HOLLINGSWORTH:

Q. How do you get at that difference? You say you don't remember exactly what they paid on single boats, and yet you think the difference was about twenty to twenty-five cents. Do you get at that from what persons told you?

A. No, sir.

Q. How did you get at it?

A. They used to have the difference in freight on a notice put up at Nanticoke. I don't remember exactly, but as near as I can remember, twenty to twenty-five cents.

Q. Still you didn't remember accurately?

A. No, sir.

Redirect examination by Mr. COOMBS:

Q. Were you not running a single and double boat that year?

A. I had a son running the single boat, and, of course, the double boat belonged to me, and I was running it myself.

Q. Don't you know what he got?

A. I did at the time, but I didn't mark it down and can't keep it forever.

Q. But you know there is a difference?

A. Yes, sir; if it would come to any particular point in it I don't

know but what I could hunt up books and know what the freight was—that is, for two or three years back; but I cannot just remember it. Sometimes I kept an account and sometimes I didn't.

JONES WISTER sworn.

Direct examination by Mr. COOMBS:

WITNESS: My age is forty-three; residence, 215 North Second street, Harrisburg; occupation, furnace-man. I am one
423 of the proprietors of the firm of J. & J. Wister, who have a blast furnace in Harrisburg.

Question. Have you been in the habit of having coal shipped to you by the Pennsylvania Canal Company's boats?

Answer. Yes, sir; I have.

Q. By both double and single boats?

A. Yes; coupled and single boats—by both.

Q. Do you know what the rates of freight have been on double and single boats?

A. I do not any more than is on their manifests. I get their duplicate manifests. Every time a boat is shipped to me there are two manifests issued, one to the boatman and one to me. The boatman brings his manifest, which is the real manifest, on which I pay a small amount of the tolls. My understanding with James Boyd & Company was that I paid the boatman $20 on every boatload of coal that he delivered to me.

Q. Are you credited with that payment in the settlement?

A. Yes; I am credited with payment in the settlement.

Q. So it does not come out of your pocket?

A. No, sir.

Q. Have you any of those manifests?

A. Oh, I have all that came last season. I looked over some and I have brought three or four here with me. I think I can give you just what you want in a very few words, if you will let me.

Q. That is just what I want.

A. I observed about three years ago a difference of about 20 cents—sometimes 21 and sometimes 19 cents—between the coal freighted to me in single and double boats. I asked a boatman the reason of it, and he told me the reason. (Objected to.) I cannot give you any more than it is hearsay. Maybe I can give you a little besides, though for the boatman not only said that, but it was marked on my manifests.

(Objected to.)

424 The MASTER: You must confine yourself to things you know of your own knowledge, and not state what you got as hearsay from others.

A. Well, I can read writing.

Mr. HOLLINGSWORTH (to the master): I would like to have you instrust the witness if he proposes to give the contents of the writings he cannot do it.

The MASTER: We do not undertake to read writings that are not before me in evidence.

The WITNESS: I cannot give you anything more than that. I never boated a ton of coal in my life. This man (indicating one of the former witnesses) can tell you just what you want. He boats, and I do not boat coal.

Mr. COOMBS: If you will let me I will put those in evidence.

The WITNESS: I would rather you would not. Of course they are here. As far as this gentleman is concerned (referring to Mr. Hollingsworth), I think you will find out that I don't know anything about it. I know nothing from my own knowledge, because I buy the coal from James Boyd & Co., delivered to me at Harrisburg at a certain figure.

Q. You have the manifests?

A. I have the manifests. I observe on the manifests two rates of freight, and there is where you stopped me. I asked a boatman why it was, and I found out.

Q. What is your objection to putting these manifests in evidence?

A. I don't object to it particularly; others have them besides me. I picked up these three or four manifests at random, and I suppose I have forty or fifty at the office. Those are only duplicates.

(After argument.)

Complainant's counsel offer in evidence the manifests.

The WITNESS: I received one there in 1880. I can't swear to that being a double boat; it had been sunk. I unloaded the
425 boat in April. In November it was sunk. It was then raised and brought around to my place and unloaded in the spring.

Mr. Wister produces duplicates of manifests headed "Office of the Susquehanna Coal Company, Nanticoke, Pa., November 17, 1880. Shipped by the Susquehanna Coal Company, in good order, on board boat E. Siple No. 2, whereof Shipe is master.

Mr. MCCREARY: That is not a company boat, but an individual boat, as Mr. Shipe gave evidence.

The WITNESS: It is a double boat, though.

Mr. COOMBS: On which the rate of freight is stated to be thirty-eight cents to Harrisburg.

The WITNESS: That is where I unloaded that boat.

Mr. COOMBS: And the witness states this coal was delivered to him at Harrisburg.

The WITNESS: Yes, sir.

By Mr. HOLLINGSWORTH:

Q. And you don't know to whom the boat belonged—whether to the Pennsylvania Canal Company or not?

A. I don't know.

By Mr. COOMBS:

Q. It was a double boat?

A. It was a double boat; that I know. It was two boats.

Q. Coupled boats?

A. Well, I wasn't there to look at those boats. I think it was a double boat; I will not swear *of* it. The reason I know especially about that boat it sunk and got a great deal of mud in the coal, and whenever coal comes to me not in good order it is my business to look and examine, and if it is not good say so. I got a little of that off from James Boyd & Co. when it came to me. The reason I happened to know about that is because it was sunk in the winter.

(Witness also produced duplicate of a similar manifest, headed "Office of the Susquehanna Coal Company, Nanticoke, Pa., May 12, 1881. Shipped by the Susquehanna Coal Company, in good order, on boat Pennsylvania Canal Company No. 1, whereof
426 Woliver is master, one cargo lump coal, Beach Haven weight;" rate of freight, fifty-seven cents.)

(Also duplicate of a similar manifest, headed "Office of the Susquehanna Coal Company, Nanticoke, Pa., November 19, 1881. Shipped by the Susquehanna Coal Company, in good order, on board boat Pennsylvania Canal Company 55, showing that a cargo of coal was shipped to Harrisburg on that boat on which the rate of freight is stated to be sixty-eight cents.")

(Also duplicate of a similar manifest, dated "Nanticoke, Pa., April 14, 1881, showing a shipment by the Susquehanna Coal Company on board boat Pennsylvania Canal Company No. 159, whereof Portzline is master, showing the rate of freight forty-two cents.")

Counsel for respondent consent that this testimony may be given in evidence in lieu of the papers being put in evidence.

Cross-examination by Mr. HOLLINGSWORTH:

Q. You don't know what those figures refer to on the manifests, 55, 159, 1, and 2?

A. That is the number of the boat, "Pennsylvania Canal Company 55."

Q. Do you know that?

A. I judge it—"Pennsylvania Canal Company No. 159." That is the number of the boat.

Q. How do — know it?

A. I don't know it; only I suppose those to be the numbers.

Counsel agree to waive the signature of the witnesses examined to-day and reported by the stenographer.

Adjourned at 12.50, subject to call by the master, Charles Howson, Esq., Forest building, 119 South Fourth street, Philadelphia, Pa.

427 ROBERT A. ROUSE:

1. My age is thirty-one years; residence, Baltimore; occupation, coal dealer; have been in that business since 1870; it might have been 1871.

Question 2. During that time have you been receiving coal by the boats of the Pennsylvania Canal Company?

Answer. Yes, sir.

Q. 3. Have you during that time been receiving coal by both single and double boats?

A. Yes, sir.

Q. 4. In 1874 was there a difference in freights on coal carried in single and double boats; and, if yea, what was that difference and what means have you of determining that question?

A. My only means of determining is from manifests brought by the boatmen of the boats of the Pennsylvania Company.

Q. 5. State whether, when you receive a cargo of coal, you receive one of these manifests from the captain of the boat with an order to pay a certain amount of freight to the captain.

A. We do.

Q. 6. Were these manifests all delivered when the coal was delivered to you?

A. These which I have here were.

Q. 7. Please produce any manifests you have for the year 1874.

(Witness produces certain papers, and says:)

A. "These are the identical manifests brought to me in the year 1874 by the captains of boats of the Pennsylvania Canal Company."

(Complainant offers the papers produced by witness in evidence, and they are marked "Complainant's Exhibit 1874 Manifests, Rouse.")

Respondent's counsel objects to the foregoing as not the best evidence of what the Susquehanna Coal Company paid for
428 freight, and whether the best evidence it does not bind or affect the present defendant in any way—*i. e.*, immaterial and irrelevant.

(Papers admitted, reserving the objection.)

Q. 8. The manifest of September 5, 1874, which is number one of that year, appears to be a manifest of coal carried on Pennsylvania Canal Company's boat No. 30. Was that a single or a double boat?

A. A single boat.

Q. 9. The rate of freight specified in this manifest is one dollar and forty cents. Did you settle for the freight at that rate?

A. Yes.

Q. 10. Manifest No. 4 of 1874 appears to be a manifest of coal carried on Pennsylvania Canal Company's boat No. 104. Was that a single or a double boat?

A. A double boat.

Q. 11. And this shows the rate of freight to be one dollar and fifteen cents per ton. Was the rate of freight you paid calculated at that rate?

A. Yes, sir.

Q. 12. Manifest No. 3 for 1874 appears to be a manifest of coal carried on Pennsylvania Canal Company's boat No. 90. Was that a double or single boat?

A. A double boat.

Q. 13. The freight in the manifest is put down at one dollar and fifteen cents. Was the rate of freight you paid calculated at that rate?

A. Yes, sir.

Q. 14. Manifest No. 5 of 1874 appears to be a manifest of coal carried on said company's boat 158. Was that a double or single boat?

A. A double boat.

Q. 15. Manifest No. 6 of 1874 appears to be a manifest of coal carried on said company's boat No. 107. Was that a single or a double boat?

A. A single boat.

Q. 16. And the rate of freight is stated to be at one dollar and forty cents. Was the freight settled at that rate?

429 A. Yes, sir.

Q. 17. In all these cases it appears that you paid a certain proportion of the freights. Were the freights so paid by you deducted from the price of the coal when you paid for the coal?

A. Yes, sir.

Q. 18. I observe attached to manifest No. 1 of 1874 and to No. 6 of 1874 a receipt for freight. Were those receipts taken at the time the manifests were delivered to you?

A. Taken at the time freight was paid.

(Receipts offered in evidence.)

(Same objections as to the manifests.)

Q. 19. Please produce any manifests you have here for the year 1875?

(Witness produces certain papers, which complainant offers in evidence.)

(Same objections.)

(Papers admitted, reserving objection, and marked "Complainant's Exhibit 1875 Manifests, Rouse.)

Q. 20. Please look over the five manifests of 1875 and state which is a manifest of freight carried in single boats and which in double boats.

A. Boat No. 2 is a single boat; boat No. 77, a double boat; boat No. 37, a single boat; boat No. 57, a single boat; boat No. 76, a double boat.

Q. 21. Whether the rates of freight stated in those manifests are the rates at which the freight was settled when you paid a part.

A. Yes, sir.

Q. 22. Please produce any manifests that you have for the year 1876.

Witness produces five manifests; proffered in evidence, objected to admitted, reserving objections, and marked "Complainant's Exhibit 1876 Manifests, Rouse."

Q. 23. Which of these refer to double and which to single boats?

430 A. Nos. 180 and 95 both single boats; the remainder are double boats.

Q. 24. Please produce any manifests you have here for the year 1878.

Witness produces seven manifests; proffered in evidence, duly objected to, admitted, reserving objections, and marked "Complainant's Exhibit 1878 Manifests, Rouse."

Q. 25. Which of these refer to double and which to single boats?

A. Nos. 31, 64, single boats; the rest double boats.

Q. 26. Please produce any manifests you have here for 1879 and say which relate to single and which to double boats.

Witness produces seven papers, which are offered in evidence, duly objected to, admitted, subject to the objections, and marked "Complainant's Exhibits 1879 Manifests, Rouse."

Witness says:

A. No. 63 is a single boat; the rest are double boats.

Q. 27. Please produce any manifests you have for the year 1880 and designate the single and double boats.

Witness produces four papers, which are offered in evidence, duly objected to, admitted, subject to the objections, and marked "Complainant's Exhibit 1880 Manifests, Rouse."

Witness says:

A. 194 and 195 are double boats; the other two single boats.

Q. 28. Please produce any manifests you have here for the year 1881 and say which relate to single and which to double boats.

"Witness produces four papers, which are offered in evidence, objected to, admitted, reserving the objections, and marked 'Complainant's Exhibit 1881' Manifests, Rouse."

Witness says:

A. 190 and 191 are double boats.

Q. 29. Please state whether in the case of all these manifests
431 which you have produced the rate of freight stated in the manifests is the rate at which the freight was settled so far as you paid a part of the same.

A. Yes; unless in cases where there may have been a mistake. I do not now know of any mistake in any of these cases.

Cross-examination:

(Witness is requested to take the papers which have been offered in evidence and refresh his recollection from them.)

Q. 30. Tell me how many single boats are referred — in these manifests in any of the years included, without referring to the papers.

A. I cannot do it; nor as to any other part of the matters embraced in the papers, except as to the freight rate last year, and as to the fact that there always was a difference between single and double-boat freight.

Q. 31. The manifests for 1874 show coal shipped on boats Nos. 30, 104, and 190 and 159, and 158 and 107; which of those boats were double and which were single?

A. Do not know without looking at the manifests.

Q. 32. What is there on the manifest which enables you to tell?

A. The rates of freight.

Q. 33. How can you tell by the rate of freight in 1874?

A. From the fact that one rate was lower than the other, and there were only two rates. I have no other way of telling, that I can recollect now. The rate of double-boat freight is not the same throughout the year. It may be one rate in June and a higher rate in November; but at the same time there would be a proportionate increase of freight rate on the single boats.

Q. 34. How can you tell when there is a difference in freight rates on the manifest whether that difference is between single and double-boat freight rates or between the rates of freight on either class at different times, applying the question to the year 1874?

A. From the fact that we have both single and double-boat manifests dated in the same month.

432 Q. 35. How do you know they were single and double boats?

A. Only judging by the manifests—the rates of freight on the manifest.

Q. 36. What was there in the rate of freight on single or on double boats which enabled you to determine?

A. The difference in the rates of freight, and from the facts that the rates of freight very seldom changed from the beginning to the close of the season.

Q. 37. Do you remember whether there was any such change in 1874?

A. No, sir.

Q. 38. If there had been a change of rates, say in 1874, on double boats, how could you tell whether the differences appearing on these manifests related to different classes or to the same class of boats?

A. From the fact that two boats, numbered, for instance, 190 and 191, manifested the same date at a rate, say of $1, and one manifested on the same day or several days after at $1.35, we would at once conclude that the latter was a single boat.

Q. 39. Suppose the interval of time was much greater, would you still make the same answer?

A. No; if the interval was of several months, if it was in the fall of the year, an interval of one month; but if in the spring, say two months.

Q. 40. Now, on May 4, 1874, there is a boat put down at $1.15, on September 5th another boat at $1.40. How do you know whether these were single or double boats?

A. From the fact that I have no recollection of the rate of freight on either single or double boats being advanced or declined during any season of over ten cents to fifteen cents.

Q. 41. If the difference in any case were not over fifteen cents you would not be able to tell, would you, whether it was double or single?

A. I cannot say positively. I would suppose it to be either a single or a double boat.

433 Q. 42. You have stated that the reason you know that in 1874, when the rate of freight in May was $1.15 and in September $1.40 on two different boats, that the latter was a single boat,

and not a difference between rates of freight on the same class of boats at different times, was that you do not recollect any season in which there was an advance or decline of freights exceeding ten or fifteen cents. Now, I ask you whether when, in that season or any other season, the difference was not over ten or fifteen cents, you can tell whether the boats between which there was this difference were single or double boats?

(Objected to as hypothetical, there being no proven case of the kind.)

A. I could by looking at the manifests.

Q. 43. How?

A. From comparing all May manifests and all September manifests and getting the two rates.

Q. 44. Suppose there were but two manifests, how could you tell?

A. I could not tell where the difference was less than ten or fifteen cents.

Q. 45. Do you recollect what the rate of freight was in 1874, at the beginning of the season, or the difference at the beginning or the end of the season, on the same class of boats?

A. No, sir.

Q. 46. Can you answer the question as to any year?

A. As to that year, an increase of seven cents at the latter part of the season as to double boats. On single boats I do not know.

Q. 47. You do not know, do you, whether any of the boats you, have testified to were single or double in any other way than from the differences in rates of freight on these manifests?

A. Yes, sir; I do.

Q. 48. How?

A. I know it from knowing the captains and knowing the
434 boats. I know that boats 190 and 191 are double boats; as to the others I do not know without looking at the manifests.

Q. 49. And is there anything in the manifests which tells you, other than the difference in rates of freight?

A. Yes; from the fact that you will find receipts from one captain for two boats at the same date.

Q. 50. Any other fact than that?

(Objected to unless the manifests be shown to the witness. Question admitted subject to objection.)

A. The numbers.

Q. 51. Is No. 180 a double or single boat?

A. I don't know.

Q. 52. No. 95?

A. Do not know; cannot give you any of them unless I see the manifest.

Q. 53. How can you tell from seeing the number of a boat on a manifest whether the boat was a single or a double boat?

A. I can't do it.

Q. 54. How can you tell from the numbers of boats on two or more manifests whether the boats are single or double?

A. I can only tell by the date of the shipment, the number of the shipment, and, for instance, 190 following 189, or 191 and 192 being shipped on the same date and the name of the captain being signed on two manifests.

Q. 55. How does the number of shipment and the date on the manifest enable you to tell whether it is a single or a double boat?

A. If the number of shipment of 190 is 1400 the number of 191 would be 1401, provided that the same captain signed both manifests.

Q. 56. When manifests do not contain shipping numbers following in consecutive order, do not bear the same date, and are not signed by the same captain, how can you tell whether they are double or single by anything else than the difference in rate of freight?

435 A. Only by knowing that the captain who signs the manifest runs double boats.

Q. 57. What captains named in the manifests produced here run double boats?

A. Feltenberger, Falury (I do not know whether he runs company boats or not). That's all I can now think of. If you would read me the names of some of the captains I might tell you whether they run double boats or not. I do not know how often or how long the captains named have run double boats, but I know they have been doing so for several years.

Q. 58. You have no recollection, have you, independent of what these manifests show, of how many double or how many single boats were run during any of the years mentioned?

A. No, sir.

Q. 59. When you stated in your examination-in-chief that so many boats were double and so many single boats that was in every case, was it not, a conclusion of your mind from what appeared in the shipping list and from nothing else?

A. Not in every case; not in the Feltenberger case. He had 190 and 191.

Q. 60. How do you know that the rate of freight at which you settled was that mentioned in the manifest in every or any case?

A. Only from looking at the manifest.

Q. 61. You have no knowledge in any other way except by looking at the manifest?

A. I have for 1881, but not for any other year.

Q. 62. Can you state from memory, independently of the manifest, that there was a difference in freight rates on single and double boats during all the years?

A. Yes.

Redirect examination:

Q. 63. You have stated, although I think not in the record, but withdrawn because not responsive to the question, that the

436 difference in freights between double and single boats during

the period from 1874 to 1881 varied from eighteen cents to twenty-five cents. Did you state that from memory, independently of the manifests?

A. I only remember it after my memory was refreshed by looking over the manifests.

Q. 64. After looking over the manifests, do you remember it sufficiently to state it as matter of memory, independent of the manifests?

A. I do.

Q. 65. During all your cross-examination, have you been permitted or not to look at any of these manifests?

A. No, sir.

Q. 66. If permitted to see the manifests, would not the name of the captain enable you to state whether the boat was a single or a double boat in some instances?

A. I think it would.

Recross-examination:

Q. 67. You have testified that the difference between single and double boats varied from eighteen to twenty-five or thirty cents. Please state what the rate of freight on double boats was in 1874.

A. I cannot tell you.

Q. 68. Then you cannot say what rate of freight was on double boats in 1874, or in any other year, except 1881?

A. No; and the same is true of single boats.

Q. 69. You cannot, therefore, recollect what the rate was on single or on double boats in any one of these years, but can recollect that there was a difference of about the amount you have named between the two?

A. Yes, sir.

Q. 70. Please explain to me how you manage to recollect this difference and yet cannot recollect the amount in any year.

A. I recollect one year in which freights were one dollar and one dollar and thirty cents; one year in which freights were fifty-six cents on double boats; don't know what they were on single.

437 Q. 71. Does that help you to find out the difference, knowing the rates on double boats, not on single boats?

A. Yes. I recollect one year when rates on double boats were seventy cents in one part of the season and seventy-seven cents in another, and I think the same year on single boats ninety-three cents part of the season.

Q. 72. How do you fix in your mind that the rate on single boats was ninety-three cents in the same year that it was from seventy to seventy-seven cents on double boats?

A. I fix it only from memory and the manifests.

Q. 73. Do you remember what boat captain you paid ninety-three cents to?

A. No.

Q. 74. Do you remember what part of the season?

A. The latter part of the season; November, I think. Do not

remember how many such payments I made; do not remember any of the attendant circumstances; recollect it was the same year we paid from seventy to seven-seven cents on double boats; remember what year it was; I think in 1881.

Q. 75. What was it in 1877?

A. Could not tell you.

Q. 76. Your recollection is nearly as clear about 1877 as it is about 1881, is it?

A. Yes, sir.

Q. 77. And yet you cannot recollect about 1877, can you?

A. Not about the rates of freight.

Q. 78. How do you recollect what the difference was in 1877?

A. I did not say I did. I do not recollect the difference.

Q. 79. How do you know, then, that the difference varied between eighteen and thirty cents if you do not know what the difference was?

A. Because I know there was never more than from eighteen to thirty cents.

Q. 80. How do you know that as to 1877, if you do not know what the difference was?

438 A. I know that there has never been any greater difference than from eighteen to thirty cents.

Re-examined:

Q. 81. When a cargo came by a pair of coupled boats, sometimes the cargo on one part of a pair would be consigned to you, and that on the other consigned to another party, would it not?

A. Yes.

Q. 82. Do you or not know so that you can state the fact without looking at a manifest that you always settled the freight, so far as you paid part of it, according to the rate stated in the manifest?

(Objected to, as the witness has stated he has no recollection on this subject except what he finds in the manifest.)

(Question excluded.)

Q. 83. In the course of your business, when you paid the part of freight which you were required to pay, dow did you ascertain at what rate you were to settle the freight?

(Same objection.)

(Question admitted.)

A. From the face of the manifest.

439 In the Circuit Court of the United States for the Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } In Equity.

On reference to Charles Howson, Esq., master, for an account.

The defendant is hereby notified that the complainant will, on

Friday, the twenty-sixth day of May, 1882, proceed to take the deposition of Edward Stabler, Jr., of Baltimore, Maryland, before Isaac Brooks, Esq., special examiner, at the office of said Brooks, No. 42 Lexington street, in Baltimore aforesaid, to be used before said master on the reference to him aforesaid, commencing as soon after 12 o'clock m. of said day as practicable, and to be continued from day to day by adjournment if found necessary.

Also that the complainant desires that the evidence be taken orally by question and answer.

J. J. COOMBS,
For Complainant.

Testimony to be taken under rule 77 and rule 67, as amended, in equity.

J. J. C.

Due service of foregoing notice admitted, and the taking of the testimony mentioned at the time and place and before the officer named assented to.

HENRY BALDWIN, JR.,
For Defendant.

Philadelphia, May 22, 1882.

440 THE UNITED STATES OF AMERICA, *District of Maryland,* } *To wit:*

I, Isaac Brooks, a special examiner, do hereby certify that on the twenty-sixth day of May, in the year of our Lord one thousand eight hundred and eighty-two, at my office in the city of Baltimore, within the district of Maryland, personally appeared before me Edward Stabler, Jr., and W. J. Mackee, witnesses for the complainant in a certain civil cause depending in the circuit court of the United States for the eastern district of Pennsylvania, wherein John McCreary is complainant and The Pennsylvania Canal Company is defendant.

And the said Edward Stabler, Jr., and W. J. Mackee, being by me first carefully examined and cautioned and duly sworn or affirmed according to law to testify the whole truth, and being examined on behalf of the complainant, make oath, depose, affirm, and say as follows, to wit:

EDWARD STABLER, Jr., a witness produced on behalf of the complainant, after being duly affirmed according to law, makes affirmation and says as follows:

Question 1. State your name, age, residence, and occupation.

Answer. My name is Edward Stabler, Jr.; I am forty-six years of age; I reside in Baltimore city, State of Maryland; I am a coal merchant.

Q. 2. How long have you been engaged in that business?

A. I have been engaged in that business on my own account since 1861.

Q. 3. From 1873 to the present time have you been in the habit

of receiving coal by the boats of the Pennsylvania Canal Company, both double and single?

A. I have.

Q. 4. When you received a cargo of coal did you receive a
441 manifest containing the number of the boat, the name of the captain, quantity of coal in the shipment, and the rate of freight per ton?

A. I did in all cases.

Q. 5. During that time did you receive coal by both double and single boats of said company?

A. I did.

Q. 6. Please look at the exhibit now shown you, marked "Exhibit W., S. B., U. S. com.," and state what it represents.

(Objected to.)

A. The exhibit in question represents generally the mode of coupling apparatus in use by said company.

Q. 7. Were or were not all the double boats of said company, by which you received coal during the time aforesaid, coupled and rigged substantially alike and in the manner shown by this photograph?

A. The double boats by which I received coal during the time mentioned were rigged substantially as shown in the exhibit. When the boats come here they are not coupled, but they are rigged for coupling as shown in the exhibit. I have seen the boats in question—some of them, I mean—coupled on the Pennsylvania canal. When the boats arrive at Havre de Grace the double boats are uncoupled for the purpose of towage to Baltimore or elsewhere.

Q. 8. When you received a cargo of coal by one of said company's boats did you or not always pay a portion of the freight at the rate named in the manifest?

A. We always paid the rate of freight named in the manifest, less the tolls and advances.

Q. 9. Was the freight so paid by you always deducted from the price of the coal when you settled or paid for the coal?

A. It was always so deducted.

Q. 10. During the time aforesaid, from 1873 to the present time, has the rate of freight on coal shipped on double and on single
442 boats been the same, or has there been a difference; and if a difference, on which class of boats was the higher rate paid?

A. On coal shipped in boats of the Pennsylvania Canal Company there has been a difference in the rate of freight. The rate of freight on coal carried in double boats of this company has been less than that carried in single boats.

Q. 11. Can you furnish a statement covering the time aforesaid, showing each cargo of coal received by you in the boats of the Pennsylvania Canal Company, giving the number of the boat, date of the manifest, the quantity of coal, whether the boat was double or single, and the rate of freight on each cargo?

A. I can; and I now produce the statement of 1874, in tabular form, marked "Exhibit E. S., Jr., No. 1."

Q. 12. Have you compared this statement with the original manifests now in your possession, and, if not, will you now make the comparison and state whether it is a correct statement or not?

A. I have made the examination with the examiner and compared the statement with the original manifests. It is a correct statement.

Q. 13. Are there any boats in this statement that were not the boats of the Pennsylvania Canal Company? If there were, please designate those that are private boats.

A. There were two private boats, and they are marked in the list with "*a*" in red ink.

(Complainant's counsel offers in evidence the statement of 1874, referred to by the witness and marked "E. S., Jr., No. 1," and also the manifests mentioned in said statement, marked (in a bundle) "E. S., Jr., No. 2.")

(Counsel for defendant objects to the offer of the complainant's counsel because the statement referred to purports to be only a schedule of certain statements appearing on the face of the manifests referred to, and the manifests appear to be statements made by the Susquehanna Coal Company, not a party to this litigation, and that the manifests are unsworn-to statements of third parties; and, further, for the reason that it does not appear how these
443 manifests came into the possession of the witness; and, finally, because it is entirely immaterial to this case what rate of freight the Susquehanna Coal Company paid anybody, if it did pay it, which does not appear.)

Q. 14. Please state whether the manifests that have been offered in evidence were received with the several cargoes of coal stated therein.

A. They were.

Q. 15. Who delivered them to you?

A. They are delivered to us by the captains of the boats.

(Counsel for defendant objects also to the offer of these papers at this time, before an opportunity to cross-examine the witness as to the papers has been afforded to defendant's counsel.)

(Counsel for the complainants states that the witness has not been discharged, and ample opportunity will be given to cross-examine him on all matters to which he has testified on his direct examination.)

(At this point the examination of Mr. Stabler was suspended to allow Mr. Mackee to be examined by consent.)

WILLIAM J. MACKEE, a witness produced on behalf of complainant, after being duly sworn, deposes and says as follows:

Question 1. State your name, age, residence, and occupation.

Answer. My name is William J. Mackee; I am twenty-four years of age; I reside in Baltimore; I am clerk for the firm of E. S. Stabler, Jr., & Co., of Baltimore, and have been so for the last six or seven years.

Q. 3. Please look at the papers now shown you, marked "E. S., Jr., No. 3" and "No. 4," and state whether you made out the paper marked "E. S., Jr., No. 3," and what you made it from.

A. The paper marked "E. S., Jr., No. 3" was made out by me from the manifests marked "E. S., Jr., No. 4."

444 Q. 4. Please state whether the paper marked "E. S., Jr., No. 3" contains a correct statement of the contents of the package marked "E. S., Jr., No. 4," showing the number of shipments, date of manifests, number of boat, name of captain, amount of coal, and showing whether the boat was double or single, also the rate of freight.

A. Yes, sir.

Q. 5. Making out the list, how did you determine whether the boat was double or single?

A. By the rate of freight.

Q. 6. Please answer the same question as in interrogatory 4 with reference to Complainant's "Exhibit E. S., Jr., No. 5 and No. 6."

A. The paper marked "E. S., Jr., No. 5" was made by me from the package of manifests marked "E. S., Jr., No. 6." It was correctly made.

Q. 7. Please answer the question as in interrogatory No. 4 in reference to Complainant's "Exhibit E. S., Jr., No. 7" and "E. S., Jr., No. 8."

A. The paper marked "E. S., Jr., No. 7" was made out by me from the package of manifests marked "E. S., Jr., No. 8." It was correctly made.

Q. 8. Answer the same question in reference to Complainant's "Exhibit E. S., Jr., No. 9" and "E. S., Jr., No. 10."

A. The paper marked "E. S., Jr., No. 9" was made out by me from the package of manifests marked "E. S., Jr., No. 10." It was correctly made.

Q. 9. Answer the same question in reference to Complainant's "Exhibit E. S., Jr., No. 11" and "E. S., Jr., No. 12."

A. The paper marked "E. S., Jr., No. 11" was made out by me from package of manifests marked "E. S., Jr., No. 12." It is correctly made.

Q. 10. Answer the same question in reference to Complainant's "Exhibit E. S., Jr., No. 13" and "E. S., Jr., No. 14."

445 A. The paper marked "E. S., Jr., No. 13" was made out by me from a package of manifests marked "E. S., Jr., No. 14." It was correctly made.

Q. 11. Answer the same question in reference to Complainant's "Exhibit E. S., Jr., No. 15" and "E. S., Jr., No. 16."

A. The paper marked "E. S., Jr., No. 15" was made out by me from the package of manifests marked "E. S., Jr., No. 16." It was correctly made.

Cross-examined by Mr. HOLLINGSWORTH:

X Q. 1. How did you determine by the rate of freight whether a boat was single or double?

A. On double boats the rate of freight is much lower than on single boats.

X Q. 2. The rate on a single boat in some part of a season will be as low as the rate on a double boat in another part of the season, will it not?

A. It might be; I don't know whether it was or not.

W. J. MACKEE.

Subscribed and sworn to before me this twenty-sixth day of May, 1882.

ISAAC BROOKS, JR.,
Special Examiner.

The examination of Mr. STABLER was then resumed:

Q. 16. Are you acquainted with the contents of the several exhibits marked "E. S., Jr., No. 3" to "E. S., Jr., No. 16," inclusive?

A. I am.

Q. 17. Are you able to point out in the tabular statements referred to what boats were boats of the Pennsylvania Canal Company and what boats were not?

A. I am. Those not boats of the Pennsylvania Canal Company are marked in the left-hand margin with the letter "A." The others are the boats of the Pennsylvania Canal Company, designated by their respective numbers.

446 Q. 18. Please state whether all the manifests contained in the exhibits referred to were received by you with the several cargoes of coal specified in them.

A. They were.

Q. 19. Please state what means you have of determining by the manifest or otherwise whether the boat is a double or single boat.

A. We ascertain that fact by the rate of freight marked on the manifest and by the invoice from the company's agents, being marked single or double boats; from my personal knowledge gained by seeing almost every boat that has come to me during this time, from personal knowledge of the captains who run double and who run single boats, and from the fact that the manifests of the double boats have consecutive shipping numbers on them and the same captain presents the manifests of the two boats when both of his boats are consigned to me at the same time. It is more or less a common practice to consign one boat to one dealer and the other boat of the same pair to another dealer.

Q. 20. Do you or not know, of your personal knowledge, independently of the manifests, that during all the time from 1873 to the present time the rates of freight have been uniformly higher on single than on double boats at the same corresponding date?

A. I do know this independently of the manifests.

Cross-examined by Mr. HOLLINGSWORTH:

X Q. 1. Can you describe what this apparatus on the Pennsylvania Canal Company's boats was to which you have referred?

A. It consists of a wheel like a steering wheel, by which the two

boats are coupled with a chain. This chain is fastened to a heavy hook on the deck of the vessels and that hook is enclosed in a heavy rubber band, which takes off the strain caused by sudden jerks or movements of the boats.

447 X Q. 2. Did you ever see any other apparatus for coupling boats than that you saw on the Pennsylvania Canal Company's boats?

A. I don't recollect having seen any other.

X Q. 3. Do you know whether there is any other mode of coupling boats or has been at any time?

A. I do not know of any other mode.

X Q. 4. Did you ever see boats coupled in any other way?

A. I do not recollect having seen them coupled any other way.

X Q. 5. When did you first see boats coupled?

A. I have seen them coupled first on the Pennsylvania canal during or since 1874. I have no recollection of ever having seen two boats coupled together before by any other method, and no boats coupled together except those of the Pennsylvania Canal Company.

X Q. 6. Have you ever heard of boats being coupled together in any other manner?

(Objected to as incompetent.)

A. I don't know whether I have or not. I cannot recollect whether I have.

X Q. 7. You have seen boats built differently in shape from those of the Pennsylvania Canal Company, have you not?

A. I have.

X Q. 8. What was the shape of those boats?

A. One end of certain boats that I have seen has been cut out or concaved, and one end of another boat forming the pair built convex, so as to fit into the other.

X Q. 9. Could the coupling apparatus that was used on the Pennsylvania Canal boats be applied to these boats?

A. I do not know.

X Q. 10. Do you remember when it was that you saw these boats which you have just described?

A. I should think it has been five years; possibly longer.

448 X Q. 11. Have you any knowledge which of the boats were single or double in this schedule which has been put in evidence to-day other than an opinion formed upon the data you have mentioned?

A. I do not think of any other at this time.

X Q. 12. You never saw all of these boats actually coupled, did you?

A. I did not. I have occasionally seen the company's boats so coupled on the canal.

Complainant's counsel offers in evidence "Exhibits E. S., Jr., No. 3" to "16," inclusive.

(Defendant's counsel objects as before.)

(Redirect by Mr. COOMBS:)

Q. 1. Did you ever see more than one pair of boats with the concave and convex ends, as you have described?

A. I do not recollect having seen more than one pair.

Q. 2. What was the name of that pair of boats?

A. The Sixteenth Amendment, to the best of my recollection.

EDWARD STABLER, JR.

Subscribed and affirmed to before me this twenty-sixth day of May, 1882.

ISAAC BROOKS, JR.,
Special Examiner.

449 COMPLAINANT'S "EXHIBIT E. S., JR., No. 1."

Shipments by Susquehanna Coal Company.

1874.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
5	April 2	88	Baker	124		1 15	
6	2	89	"	121		1 15	
39	6	73	Burlingame	117		1 15	
45	7	156	Hughes	116		1 15	
68	8	165	Faux	121		1 15	
93	11	36	Gemberling		112		1 40
108	14	159	Portzline	124		1 15	
126	15	51	Lee		111		1 40
140	18	49	Blouse		119		1 40
A 1	20	Annsylvania Allen.	Milton		102		1 45
A 5	25	Stephens	Atherton		107		1 45
197	27	120	Shoemaker	121		1 15	
198	27	121	"	125		1 15	
208	28	88	Baker	127		1 15	
209	28	89	"	129		1 15	
226	30	107	Webb		116		1 40
251	May 2	57	Courson		112		1 40
280	4	105	Garrison	126		1 15	
341	8	137	Blankenhorn	100		1 15	
400	12	119	Gemberling	127		1 15	
496	18	8	Smith		112		1 40
573	25	104	Garrison	124		1 15	
574	25	105	"	124		1 15	
716	June 5	16	Burlingame		120		1 40
719	5	22	Ruch		118		1 40
728	5	33 Barge.	Eddy		121		1 40
747	6	136	Blankenhorn	123		1 15	
767	9	126	Turner	126		1 15	
857	15	128	Lingle	123		1 15	
881	17	22	Ruch		116		1 40
895	17	105	Garrison	125		1 15	
450							
912	June 19	102	Davis	131		1 15	
1020	29	50	McKinney		121		1 40
1063	July 1	22	Ruch		114		1 40

Complainant's "Exhibit E. S., Jr., No. 1"—Continued.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
		Barge.					
1098	3	136	Blankenhorn	126		1 15	
1120	8	2	Waltman		118		1 40
1133	9	10	Nuss		115		1 40
1345	24	31	Cuff		115		1 40
1421	31	137	Blankenhorn	98		1 15	
1422	31	28	Basom		114		1 40
1435	31	22	Ruch		112		1 40
1491	Aug. 6	158	Portzline	125		1 15	
1492	6	159	"	126		1 15	
1507	7	7	Bitner		110		1 40
1524	10	95	Gottschall	125		1 15	
1545	12	166	Leidy	121		1 15	
1556	13	107	Webb		120		1 40
1602	18	2	Waltman		117		1 40
1675	24	22	Ruch		114		1 40
1720	27	51	Molten		120		1 40
1724	27	78	Burlingame	126		1 15	
1743	28	31	Cuff		115		1 40
		Barge.					
1756	29	136	Blankenhorn	131		1 15	
1768	31	63	Munder		110		1 40
1769	31	58	Murray		116		1 40
1820	Sept. 3	20	Pressler		107		1 40
1833	4	121	Shoemaker	122		1 15	
1845	5	59	Nagle		110		1 40
1847	5	2	Waltman		115		1 40
1853	7	62	Young		112		1 40
1919	12	22	Ruch		115		1 40
1976	17	99	Grow	121		1 15	
1977	17	98	"	119		1 15	
1982	17	35	Balmey		111		1 40
1995	18	31	Cuff		118		1 40
2046	24	157	Hughes	120		1 15	
2063	25	49	Nevil		113		1 40
2058	25	137	Blankenhorn	90		1 15	
2134	Oct. 6	96	Dintemian	122		1 15	
2222	14	22	Ruch		114		1 40
2231	15	120	Shoemaker	119		1 15	
2232	14	121	"	122		1 15	
2248	16	85	Reily	123		1 15	
2251	16	31	Cuff		116		1 40
2305	21	8	Smith		112		1 40
451							
2456	Nov. 4	59	Nagle		119		1 40
2464	4	81	Urie	121		1 15	
2533	12	164	Faux	125		1 15	
2540	12	135	Hipple	120		1 15	
2562	13	54	Campbell		117		1 40
2569	14	94	Gottschall	120		1 15	
2642	20	88	Baker	125		1 15	
2643	20	89	"	123		1 15	
2645	21	104	Garrison	121		1 15	
2662	23	98	Grah	125		1 15	

452 COMPLAINANT'S "EXHIBIT E. S., JR., No. 3."

Shipments by Susquehanna Coal Company.

1875.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
1	June 17	57	Courson		100		1 35
4	19	64	Plotz		103		1 35
9	23	154	Burrell	105		1 10	
10	23	155	"	106		1 10	
14	25	60	Huggins		105		1 35
17	29	126	Turner	110		1 10	
18	29	127	"	109		1 10	
28	July 3	72	Burlingame	109		1 10	
29	3	73	"	110		1 10	
34	3	88	Baker	113		1 10	
39	7	107	Webb		106		1 35
48	7	68	Nagle	112		1 10	
58	8	123	Shuse	112		1 10	
89	10	30	Frey		114		1 35
103	10	8	Butcher		106		1 35
120	12	106	Funk		114		1 35
135	13	134	Hipple	110		1 10	
136	13	135	"	112		1 10	
162	14	14	Houseal		108		1 35
186	15	51	Wooliver		108		1 35
209	16	154	Burrell	108		1 10	
231	17	63	Mundorf		98		1 35
A 278	20	William & Joseph.	Kurtz		106		1 35
310	22	165	Faux	113		1 10	
333	23	124	Kinney	110		1 10	
351	24	81	Rorick	112		1 10	
A 368	24	Tom and John	Brobst		102		1 35
396	27	52	Leiphardt		107		1 35
417	28	54	Campbell		106		1 35
440	29	2	Waltman		109		1 35
444	29	56	Powlus		107		1 35
474	30	90	Malady	116		1 10	
475	30	91	"	115		1 10	
494	August 2	60	Huggins		117		1 35
507	4	172	Gramm	124		1 10	
453							
508	August 4	173	Gramm	122		1 10	
A 531	5	G. B. Grayhill	Herold		111		1 35
540	5	136	Blankenhorn	119		1 10	
553	6	102	Ickoff	125		1 10	
579	7	84	Abbott	125		1 10	
618	10	94	Gottschall	123		1 10	
619	10	95	"	122		1 10	
640	11	168	Linden	125		1 10	
712	13	120	Shoemaker	121		1 10	
726	14	81	Rorick	123		1 10	
729	14	89	Baker	125		1 10	
772	17	122	Shure	121		1 10	
798	18	70	Funk	120		1 10	

Complainant's "Exhibit E. S., Jr., No. 3"—Continued.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
799	18	71	"	122		1 10	
808	19	132	Finley	125		1 10	
A 826	20	Good Intent	Elliott		1 21		1 35
840	21	119	Gemberling	122		1 10	
870	23	50	Krotzer		119		1 35
872	23	126	Turner	121		1 10	
A 897	24	Susquehanna	Miller		124		1 35
922	26	31	Cuff		113		1 35
961	27	9	Reisinger		109		1 35
996	30	97	Dintermann	118		1 10	
1018	31	170	Thornton	127		1 10	
1218	Sept. 11	153	Hughes	124		1 10	
1234	13	118	Gemberling	125		1 10	
1279	15	17	Houseman		117		1 35
1282	15	79	Derr	126		1 10	
1283	15	80	"	126		1 10	
1308	17	37	Noblett		121		1 35
1333	18	168	Linden	125		95	
1361	21	137	Blankenhorn	94		1 10	
1368	21	64	Plotts		115		1 35
1386	23	72	Burlingame	124		1 10	
1387	23	73	"	125		1 10	
1402	24	69	Nagle	125		1 10	
1408	24	165	Faux	127		1 10	
1420	25	104	Garrison	125		1 10	
1443	27	49	Nevill		116		1 35
1460	28	78	Burlingame	127		1 10	
1475	29	88	Baker	128		1 10	
1487	29	107	Webb		119		1 35
1506	30	9	Reisinger		112		1 35
1525	Oct. 1	103	Ickoff	126		1 10	
454							
1874	Oct. 23	89	Baker	125		1 10	
1873	23	88	"	126		1 10	
1893	25	37	Noblett		122		1 35
1929	27	167	Leighty	124		1 10	
2009	Nov. 2	34			116		1 35
2110	9	136	Blankenhorn	123		1 10	
2132	10	49	Nevel		122		1 35
2144	11	37	Noblett		126		1 35
2169	12	17	Houseman		119		1 35
2223	16	59	Nagle		121		1 35
2228	17	70	Funk	125		1 10	
2229	17	71	"	127		1 10	
2241	18	94	Gottschall	131		1 10	
2265	19	157	Hughes	129		1 10	

455 COMPLAINANT'S "EXHIBIT E. S., JR., No. 5."

Shipments by Susquehanna Coal Company.

1876.

No. of shipment.	Date of manifest.		No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
					Double.	Single.	Double.	Single.
9	April	5	68	Nagle	124		1 00	
10		5	69	"	125		1 00	
37		10	176	Stookey	128		1 00	
52		11	106	Funk		118		1 30
133		21	136	Blankenhorn	123		1 00	
134		21	137	Blankenhorn	94		1 00	
127		21	17	Houseman		117		1 30
155		22	63			115		1 30
165		24	86	Riley	128		1 00	
214		27	8	Butcher		115		1 30
215		27	107	Webb		120		1 30
235		28	68	Nagle	126		1 00	
236		28	69	"	127		1 00	
279	May	2	50	Kroster		113		1 30
A 288		3	E P. Unum	Nixon		118		1 30
302		4	57	Courson		119		1 30
305		4	125	Kinney	122		1 00	
313		4	129	Lingle	126		1 00	
328		5	181	Staily	126		1 00	
342		6	162	Klinger	125		1 00	
343		6	163	"	126		1 00	
377		9	32	Heavner		116		1 30
392		10	98	Grow	123		1 00	
A 430		13	Swatara			124		1 30
477		17	136	Blankenhorn	124		1 00	
478		17	137	"	96		1 00	
626		25	83	Turner	122		85	
627		25	84	"	127		85	
676		29	17	Houseman		118		1 30
820	June	7	35	Gottschall		119		1 30
866		12	54	Campbell		118		1 30
957		19	136	Blankenhorn	126		1 00	
963		19	164	Faux	127		1 00	
964		19	165	"	125		1 00	
992		22	17	Houseman		118		1 30
1053		26	135	Hipple	125		1 00	
456								
1164	July	5	60	Huggins		119		1 30
1178		6	66	Fausey		118		1 30
1194		7	174	Mills	128		1 00	
1195		7	175	"	130		1 00	
1223		10	88	Baker	128		1 00	
1224		10	89	"	124		1 00	
1262		12	11	Liddy		113		1 30
1273		13	125	Kinney	122		1 00	
1287		14	91	Malady	127		1 00	
1338		20	80	Derr	125		1 00	
1382		22	187	Caison	127		1 00	
1386		22	107	Webb		118		1 30
1389		22	193	Nagle	135		1 00	

Complainant's "Exhibit E. S., Jr., No. 5"—Continued.

	No. of shipment.	Date of manifest.		No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
						Double.	Single.	Double.	Single.
	1473		28	182	E. A. Kinney	128		1 00	
	1474		28	183	"	126		1 00	
	1512		31	86	Riley	129		1 00	
	1531	Aug.	1	198	J. D. Shure	135		1 00	
	1532		1	199	"	135		1 00	
	1702		9	17	Houseman		116		1 30
A	1708		9	E. D. Kenn'dy.	Weaver		115		1 30
	1832		16	182	Kinney	129		1 00	
	1944		23	17	Houseman		120		1 30
A	1988		26	Ella of Troy.			109		1 30
	2031	Sept.	7	30	Fry		123		1 10
A	2053	Lost on Cheasapeake Bay in storm.	8	170	Thornton			85	
A	2068		9	E. D. Kennedy.	Weaver			1 10	
A	2069		9	5	Eddy			1 10	
	2070		9	56	Powlers		118		1 10
	2172		15	8	Butcher		116		1 10
	2242		19	17	Houseman		120		1 10
	2384		29	188	Nagle	130		85	
	2385		29	189	"	132		85	
	2390		29	84	Derr	132		85	
	2407		30	195	H. E. McKelvey	133		85	
	2408		30	53	Malady		121		1 10
	2490	Oct.	5	14			116		1 10
	2510		6	107	Webb		121		1 10
457									
	2516	Oct.	7	130	Jno. Eddy	126		85	
	2517		7	131	"	125		85	
	2542		9	17	Houseman		121		1 10
	2567		10	2	E. E. Smith		129		1 10
	2588		11	168	Linden	128		85	
	2595		12	88	Baker	126		85	
	2891		28	17	Houseman		122		1 10
	2910		28	2	Smith		133		1 10
A	2922		30	E. B. Stabler.	Weaver		133		1 10
	3080	Nov.	8	1	Waltman		127		1 10
	3089		8	194	McKelvey	137		85	
	3090		8	195	"	137		85	
	3169		13	128	Lingle	130		75	
	3196		14	17	Houseman		118		1 10
	3294		18	2	Smith		132		1 10
A	3298		18	Brag	Freet		97		1 00

458 COMPLAINANT'S "EXHIBIT E. S., JR., No. 7."

Shipments by Susquehanna Coal Company.

1877.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
2	April 9	22	Ruch		118		1 00
6	9	64	Plotts		111		1 00
23	10	48	Snyder		118		1 00
29	11	107	Webb		121		1 00
30	11	126	Turner	125		75	
31	11	127	"	125		75	
49	12	61	Nagle		115		1 00
345	May 1	204	Wagner	135		75	
346	1	205	"	104		75	
		Pa. serv.					
347	1	1	Walton		127		1 00
396	3	10			105		1 00
437	7	168	Linden	127		75	
438	7	169	"	129		75	
446	7	210	Gramm	129		75	
447	7	211	"	129		75	
498	9	124	Kinney	120		75	
542	12	194	McKelvey	130		75	
881	June 4	185	Baker		129		100
897	4	210	Gramm	134		75	
898	4	211	"	132		75	
919	5	133	Finley	131		75	
1155	18	204	Reynolds	138		75	
1156	18	205	"	108		75	
A 1264	23	H. W. White	Weaver		125		1 00
A 1445	July 5	E. B. Stabler	"		129		1 00
1744	23	79	Derr	124		75	
1745	July 23	80	Derr	124		75	
1787	24	2	Smith		127		1 00
1808	25	158	Portzline	118		75	
1809	25	159	"	125		75	
1841	Aug. 15	84	Derr	125		75	
1847	17	55			124		1 00
1848	17	168	Linden	128		75	
1849	17	169	"	129		75	
459							
1852	18	85	Shoemaker	128		75	
1853	18	86	"	126		75	
1864	23	174	Mills	128		75	
1887	30	131	Eddy	124		75	
1888	30	176	Stookey	126		75	
1908	Sept. 6	167	Lighty	123		75	
A 1924	13	E. B. Stabler			134		1 00
1929	14	207	Shoemaker		132		1 00
1948	20	49	Nevell		116		1 00
1975	29	75	Ickhoff	125		75	
2008	Oct. 11	212	Mottem	130		75	
2009	11	213	"	132		75	
2037	13	208	Noll	135		75	
2088	13	209	"	135		75	

Complainant's Exhibit E. S., Jr., No. 7—Continued.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
2048	13	2	Smith		129		1 00
2433	Nov. 5	32	Heavner		117		1 00
2457	6	128	Lingle	126		75	
2617	16	208	Null	135		75	
2618	16	209	"	136		75	
2635	16	187	Caison	130		75	
2644	17	182	Kinney	125		75	
2645	17	183	"	126		75	
2657	19	76	Pence	126		75	
2658	19	87	Pence	126		75	
2697	20	197	Stewold	131		75	

460 COMPLAINANT'S "EXHIBIT E. S., JR., No. 9."

Shipments by Susquehanna Coal Company.

1878.

155	April 16	198	Ritter	131		75	
156	16	199	"	131		75	
317	May 9	31	Ruch		118		1 00
341	11	32	Eddy		116		1 00
342	11	107	Dawson		117		1 00
353	13	194	McKelve	128		75	
354	13	195	"	131		75	
372	14	206	Sterrick		130		1 00
400	15	5	Webb		132		1 00
432	17	220	Baker	132		75	
433	17	219	"	133		75	
A 447	18	John H. Allen	Weaver	130			
450	18	1	Waltman		129		1 00
A 724	June 18	E. B. Stabler	Weaver		134		1 00
A 734	19	J. H. Allen	"		133		1 00
830	25	214	Hunt	137		75	
831	25	215	"	140		75	
835	25	May	Lingle		136		1 00
A 836	25	Dolley	"		139		1 00
894	28	104	Garrison	127		75	
895	28	105	"	126		75	
951	July 15	5	Webb		135		1 00
A 1153	24	John H. Allen	Weaver		132		1 00
A 1187	26	May	Lingle		139		1 00
1188	26	Dolley	"		137		1 00
1262	Aug. 2	1	Waltman		126		1 00
1287	5	94	Gotshall	129		75	
1288	5	95	"	128		75	
A 1403	9	J. H. Allen	Weaver		132		1 00
1671	31	47	Koch		122		1 00
A 1674	31	May	Lingle		140		1 00
1675	31	Dolley	"		142		1 00
1686	Sept. 9	37	Noblett		124		1 00

Complainant's Exhibit E. S., Jr., No. 9—Continued.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
461							
A 1711	Sept. 11	E. B. Stabler	Weaver		132		1 00
A 1740	13	J. H. Allen	"		134		1 00
1750	13	94	Gotshall	130		75	
1751	13	95	"	128		75	
1844	19	208	Mill	138		75	
1845	19	209	"	136		75	
1877	24	217	Geisinger	137		75	
1908	26	203	Rawhouser		135		1 00
1915	27	188	Nagle	131		75	
1916	27	189	"	129		75	
1946	28	74	Ickhoff	129		75	
1960	30	219	Baker	138		75	
A 2112	Oct. 10	J. H. Allen	Weaver		134		1 00
A 2117	11	May	Lingle		140		1 00
A 2118	11	Dolley	"		140		1 00
2154	14	37	Noblett		125		1 00
2173	15	136	Keller	130		75	
2201	17	94	Gotshall	130		75	
2202	17	95	"	129		75	
2209	17	54	Wertz		120		1 00
2214	17	202	Herrald		136		1 00
2228	19	169	Linden	128		75	
2250	21	1	Waltman		126		100
2277	29	168	Linden	130		75	
A 2568	Nov. 13	J. H. Allen	Weaver		134		1 00
2596	15	37	Noblett		126		1 00
A 2600	15	May	Lingle	138			
A 2601	15	Dolley	"	143			
2631	18	101	Robertson	132		75	
2676	21	208	Null	137		75	
2677	21	209	"	135		75	

462 COMPLAINANT'S "EXHIBIT E. S., JR., No. 11."

Shipments by Susquehanna Coal Company.

1879.

13	April 9	31	Ruch		117		75
15	9	192	Nagle	133		56	
16	9	193	"	133		56	
84	11	185	Baker		127		75
94	16	197	Herrold	135		56	
104	17	71	Funk	126		56	
115	22	1	Waltman		127		75
125	23	50	Yentzer		118		75
137	24	200	Kercher	137		56	
162	25	136	Keller	127		56	
166	26	215	Hunt	135		56	
179	28	101	Robinson	130		56	
188	28	97	Kurtz	128		56	
195	29	198	Ritter	131		56	

Complainant's "Exhibit E. S., Jr., No. 11"—Continued.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
A 224	30	Dolley	Lingle		140		75
A 225	20	May	"		138		75
A 461	May 16	J. H. Allen	Weaver		133		75
548	22	132	Finley	129		56	
A 558	23	E. B. Stabler.	Weaver		134		75
562	23	69	Fedder	128		56	
574	24	216	Geisinger	136		56	
575	24	217	"	137		56	
576	24	74	Ickhoff	128		56	
604	26	212	Mottine	132		56	
610	26	203	Rawhouser		133		75
623	27	95	Gotshall	125		56	
683	31	164	Faux	128		56	
A 715	June 2	May	Lingle	138		56	
A 716	2	Dolley	"	138		56	
A 743	4	Claudie & Irwin.	Lighthiser		120		75
757	5	3	Heavner		123		75
A 785	6	Young Harry.	Lighthiser		126		75
A 925	14	John H. Allen	Weaver		135		75
943	16	132	Finley	130		56	
468							
944	16	133	Finley	130		56	
999	19	192	Nagle	134		56	
1000	19	193	"	134		56	
1024	19	209	Null	138		56	
1057	21	94	Gotshall	128		56	
1058	21	95	"	127		56	
1125	25	3	Heavner		126		75
1152	27	167	Leidy	123		56	
1180	28	87	Pence	126		56	
1195	30	98	Groh	125		56	
1554	July 25	1	Ruch		125		75
1555	25	184	Feltenberger	137		56	
1556	25	218	"	138		56	
1641	30	76	Pence	129		56	
1642	30	87	"	127		56	
1651	31	219	Baker	140		56	
1652	31	220	"	137		56	
1654	31	82	Rourk	129		56	
1667	31	92	Klinger	129		56	
1668	31	93	"	130		56	
2243	Sept. 4	190	Feltenberger	130		56	
2244	4	191	"	132		56	
2257	5	120	Gillen	128		56	
2258	5	121	"	127		56	
2370	12	95	Gotshall	127		56	
2440	17	167	Leidy	124		56	
2585	26	Pa. ba'ge 221.	Abbott	135		49	
2586	26	Pa. stmr. 222.	"	100		56	
2644	30	195	McKelvey	132		56	
2739	Oct. 6	50	Yentzer		120		75
2740	6	3	Heavner		128		75

Complainant's "Exhibit E. S., Jr., No. 11"—Continued.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
2763	7	219	Baker	137		56	
2764	7	220	"	139		56	
2884	14	1	Ruch		127		75
3015	23	221	Nagle	136		56	
3016	23	222	"	100		56	
3111	29	136	Keller	131		56	
3112	29	137	"	115		56	
3126	29	218	Feltenberger	134		56	
3132	30	135	Riley	129		56	
3314	Nov. 11	187	Carson	131		56	
3323	12	216	Linden	139		56	
3324	12	217	"	137		56	
3397	15	221	Nagle	136		56	
3398	15	222	"	100		56	

464 COMPLAINANT'S "EXHIBIT E. S., JR., NO. 13."

Shipments by Susquehanna Coal Company.

1880.

45	April 9	221	Nagle	137		58	
73	12	3	Heavner		129		85
321	29	221	Nagle	134		58	
322	29	222	"	95		58	
325	29	3	Heavner		127		85
607	May 21	3	"		127		85
725	June 2	98	Groh	128		64	
726	2	99	"	126		64	
755	4	190	Feltenberger	130		64	
783	5	5	Webb		136		85
793	7	202	Harrold		134		85
810	8	3	Heavner		131		85
918	12	207	Shoemaker		134		85
1090	24	3	Heavner		126		85
1091	24	5	Webb		136		85
1107	25	55	Schechterly		117		85
1164	28	189	Nagle	128		64	
1179	29	219	Baker	133		64	
1180	29	220	"	134		64	
1373	July 12	3	Heavner		125		85
1414	15	5	Webb		133		85
1447	16	212	Mottern	133		64	
1575	24	219	Baker	135		64	
1576	24	220	"	134		64	
1656	29	165	Faux	126		64	
A 1716	31	T. D. Herrick.	Cassatt		120		85
1754	August 5	32	Eddy		120		85
1755	5	120	Gillen	124		64	
1756	5	121	"	126		64	
1877	11	176	Remaley	129		64	
1878	11	177	"	128		64	
1920	13	85	Shoemaker	127		64	

Complainant's "Exhibit E. S., Jr., No. 13"—Continued.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
1940	14	191	Feltenberger	128		64	
1973	17	219	Baker	134		64	
1974	17	220	"	134		64	
1984	17	3	Heavner		128		85
465							
2156	Aug. 27	165	Faux	124		64	
2209	30	225	Fry	130		64	
2210	30	226	"	132		64	
2381	Sept. 9	74	Ickhoff	127		64	
2382	9	75	"	126		64	
2433	11	219	Baker	133		64	
2434	11	220	"	133		64	
2468	14	189	Moyer	130		64	
2487	15	88	Gemberling	129		64	
2565	20	83	Derr	128		64	
2566	20	84	"	128		64	
2584	Aug. 24	5	Webb		134		85
2622	Sept. 22	226	Wertz	134		64	
2672	24	207	Shoemaker		131		85
2684	25	201	Karshner	131		64	
2765	30	223	Smithers	134		64	
2766	30	224	"	133		64	
3163	30	203	Rawhouser		139		85
3265	Oct. 25	72	Burlingame	127		64	
3285	26	98	Groh	126		64	
3286	26	99	"	128		64	
3395	Nov. 3	229	Liddy	135		64	
3396	3	230	"	132		64	
3408	3	175	Mills	129		64	
3464	6	75	Ickhoff	128		64	
3556	11	201	Karchner	135		64	
3568	11	211	Boone	133		64	
3670	17	106	Funk		120		85
3671	17	132	Finley	130		64	
3672	17	133	"	127		64	
3693	18	203	Rawhouser		137		85
3727	19	68	Reese	126		64	

466 COMPLAINANT'S "EXHIBIT E. S., JR., NO. 15."

Shipments by Susquehanna Coal Company.

1881.

54	April 14	191	Feltenberger	131		70	
73	15	2	Smith		131		93
99	18	212	Mottern	137		70	
117	19	5	Webb		137		93
167	22	233	Derr	136		70	
180	23	242	Houseman	134		70	
721	26	237	Gotshall	136		70	
722	26	238	"	136		70	

Complainant's "Exhibit E. S., Jr., No. 15"—Continued.

	No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Am't of coal.		Rate of freight.	
					Double.	Single.	Double.	Single.
	800	June 1	219	Baker	134		70	
	801	1	220	"	135		70	
	920	7	5	Weil		136		93
	966	13	206	Sterricks		134		93
	1240	July 1	246	Portzline	135		70	
	1467	19	170	Nagle	137		70	
	1468	19	173	"	138		70	
	1500	21	208	Null	135		70	
	1501	21	209	"	136		70	
A	1543	25	Virtue	Nixon		133		93
	1579	27	3	Heavner		128		93
	1759	Aug. 16	168	Shiner	125		70	
	1760	16	169	"	125		70	
	1874	22	3	Heavner		124		93
	1975	27	126	Donohue	114		70	
	1976	27	127	"	121		70	
	2043	31	241	Houseman	130		70	
	2147	Sept. 7	231	Klinger	130		70	
	2236	13	3	Heavner		125		93
	2256	14	212	Sholley	130		70	
	2371	20	176	Remaley	126		70	
	2372	20	177	"	126		70	
	2471	30	81	Decarlton	125		70	
	2472	30	82	"	125		70	
	2523	Oct. 3	223	Smithers	132		70	
	2557	5	3	Heavner		125		93
	2687	12	194	McKelvey	130		77	
	2688	12	195	"	131		77	
	2891	24	190	Feltenberger	127		77	
	2892	24	191	"	128		77	
467								
	2917	Oct. 25	239	Noblett	133		77	
	2963	27	126	Donoho	122		77	
	3003	29	241	Houseman	133		77	
	3004	29	242	"	133		77	
	3079	Nov. 3	168	Shiner	129		77	
	3080	3	169	"	126		77	
	3155	8	230	Leighty	130		77	
	3184	8	48	Brink		124		102
	3227	11	93	Boone	132		77	
	3310	16	208	Null	135		77	
	3432	23	126	Donoho	123		77	
	3490	28	225	Wertz	134		77	
	3491	28	226	"	136		77	

468 COMPLAINANT'S EXHIBIT.

"Fairman's Memorandum Book."

Pennsylvania double boats.

1881.		Nos.
Oct.	24, Capt. R. Ickhoff	75 & 74
	24, Logan Bloom	160 & 161
	24, Crow Espy	98 & 99
	24,	122 & 123
	24,	136 & 137
	24,	109 & 108
	24, David Shoemaker	204 & 200
	24,	68 & 69
	24, John Burlingame, Lime Ridge	259 & 260
	24, James Staily, Liverpool	180 & 181
	24, Wm. Wertz, Newport	225 & 226
	25, Benj. Lighty, Tidewater	229 & 230
	25,	117 & 116
	25, John Eddy, Beach Haven	131 & 130
	26, Wm. Webb, Lime Ridge	253 & 254
	25, Wm. Linden, Beach Haven	216 & 217
	25,	150 & 151
	25, Alf. Berlingame, R. F. Lewis	78 & 77
	25,	104 & 105
	25, Cerene Clinger, Liverpool	247 & 248
	25, All. Clinger, Liverpool	231 & 232
	25,	138 & 139
	25, Wm. Portzline, Liverpool	245 & 246
469		
	25, Peter Durr, Liverpool	255 & 256
	25, Baker Kurtz, Bainbridge	96 & 97
	26, Samuel Durr, Liverpool	233 & 234
	26, Lace McKees	134 & 135
	26, Frank Feltenberger, Bainbridge	190 & 191
	26,	166 & 167
	26, Jeff. Free, New Buffalo	162 & 163
	26, Morgan Huber, Clark's Ferry	111 & 110
	26, Geo. Shelenberger, Columbia	142 & 143
	26, Willis Fox, Espy	164 & 165
	26,	128 & 129
	26, Christ. Plotts	154 & 155
	26, Nat. Noblet, New Buffalo	239 & 240
	26, R. F. Lewis	73 & 72
	26,	40 & 43
	26, James Shultz, Bloom	148 & 149
	26, Wm. Mills, Lime Ridge	174 & 175
	26, Till. Nagle, steamer Espy	221 & 222
	27, John Finley, Bainbridge	132 & 133
	27, Bordy	243 & 244

1881.		Nos.
Oct.	27, Wm. Gotshall	144 & 145
	27,	214 & 215
	27, Wm. Woolever, Danville	158 & 159
	27,	25 & 24
	27, Ketle Murry	27 & 26
	27,	176 & 177
	28, Wm. Donohoe, McCall's Ferry	126 & 127
	28, Wm. Thomas, Bloom	146 & 147
	28,	88 & 89
	28,	168 & 169
	29, Fred. Gramm, Bainbridge	87 & 76
	29, Fred. Robinson, Marietta	100 & 101
	29, Jacob Null, R. F. Lewis	208 & 209
	29, John Hughes	156 & 157
	29, " "	219 & 220
	30, Sunday.	
	31, Benner Ickhoff, Northumberland	102 & 103
	31,	194 & 195
470		
	31, Charles Mottine, Danville	235 & 236
	31,	46 & 45
	31,	114 & 115
Nov.	1, Newton Funk, Liverpool	70 & 71
	1, First Round Stern	178 & 179
	1,	39 & 42
	1,	38 & 41
	1,	210 & 211
	1,	249 & 250
	1,	172 & 171
	1, Jacob Reese	68 & 69
	2, Charles Gotshall, Middletown	94 & 95
	2, Geo. Gotshall, Middletown; R. F. Lewis	237 & 238
	4,	83 & 84
	11,	184 & 218
	11,	188 & 189
	11,	120 & 121
	11, Capt. Maris Nagle, Marietta	261 & 262
	Total pair	78
	And	22
		100

NANTICOKE, *October 29th*, 1881.

Taken by Drew Fairman:

	Nos.
Pennsylvania boats	124 & 125
	251 & 252
	81 & 82

	Nos.
Pennsylvania boats	223 & 224
	257 & 258
	227 & 228
	192 & 193
	140 & 141
	196 & 197
	80 & 79

471

Pennsylvania boats	118 & 119
	198 & 199
	212 & 213
	241 & 242
	67 & 44
	85 & 86
	170 & 173
	182 & 183
	90 & 91
	186 & 187
	112 & 113
	152 & 153
Total	22

472 SEPTEMBER 6, 1882.

Present: J. J. Coombs, Esq., for complainant, and S. S. Hollingsworth, Esq., for defendant.

JOHN MCCREARY, being duly sworn, deposes as follows:

1. Do you know of any additional coupled boats of the Pennsylvania Canal Company not included in the Fairman list? If so, please state what you know on the subject.

A. This spring and summer I find on the canal numbers 263 and 264, 265 and 266, 267 and 268, 269 and 270, 271, 272, 273, 274, 275 and 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 92 and 93, on old pair of boats. The boats from 263 to 286 I believe to be new boats. I inquired of the captains. They informed me that they were put on this spring, and being an old boat-builder I could tell that those boats were new.

2. State whether or not all these boats which you have just mentioned have the same coupling and steering rigging as all the other double boats of the Pennsylvania Canal Company on the canal.

A. These boats have precisely the same rigging as the boats of former years of the Pennsylvania Canal Company. The same as testified in the former evidence.

3. Were they all rigged as shown in photograph Exhibit "W?"

A. They are precisely.

4. Did you see all of these boats yourself?

A. Yes.

5. Please state what difference there is in the construction of single and of double boats besides the steering and coupling rigging.

A. There is a great deal of difference in the construction of boats that are built for the steering and coupling rigging. They are built with a large bow and stern deck to accommodate this
473 coupling and steering rigging, while the single boat, built by said company to run as a single boat, has a small, trifling deck that would not accommodate any part of this rigging, with the cabin on the stern end and a horse stable on the bow end, while the double-coupled boats have the horse stable and cabin in the middle of each boat—the horse stable on one and the cabin on the other.

The bow of the rear coupled boat has to be peculiarly constructed to allow the screw wheel to operate, with a slot in the deck of the boat to sink it deep enough to not come in contact with the bridges.

6. State whether all the coupled boats of the company that you have seen are constructed in the way you have described.

A. They are.

7. How long have you lived on the bank of the canal?

A. I have been building and repairing boats on the bank of the canal since the spring of 1850, till within one year. I have quit the business, but am yet located close by the bank of the canal.

8. Whether or not you must have seen all the boats of the Pennsylvania Canal Company that have been run on the canal during the last eight or nine years?

A. I think I have seen all the Pennsylvania Canal Company's boats—all that pass our place—and I believe they all have passed our place.

9. State whether this coupling and steering rigging on the double boats is permanently affixed to the boats.

A. I would say that this rigging is very permanently fastened and bolted to those Pennsylvania Company's boats. I, as a boat-builder, would sooner undertake to put the rigging on than to take it off.

10. Have you ever known the company's double boats to make trips separately; and, if yes, to what extent?

A. I have never seen any pass our place that were not coupled.
474 11. State, as nearly as you can, what would be the cost of putting on the coupling and steering rigging that is used on the Pennsylvania Canal Company's double boats.

A. I would suppose that the rigging of the Pennsylvania Canal Company's boats would cost on boats, including labor and putting on, close to one hundred dollars per pair of boats.

12. You stated in your testimony in the former part of this case that the rigging that you put on the Hall boats cost thirty-one dollars per pair. How much additional would it cost to put that rigging on the boats?

A. To attach it on a pair of our boats it would cost from ten to fifteen dollars, while on the Pennsylvania Canal Company's double boats the rigging they use costs just about double that. That is why I say their rigging on the Pennsylvania Canal Company's boats would cost one hundred dollars.

13. Something has been said in the testimony heretofore taken about one pair of the Pennsylvania Company's boats having the McCreary rigging. Please explain how that happened.

A. Early in getting this patent, A. J. Whitney, assistant engineer of the Pennsylvania Canal Company, asked of me and my brother if we believed this rigging would steer a barge coupled ahead and shoved by a steamer in the rear. We told him we believed it would, and he asked us if we would give him the right to use a rigging to test. We gave him the right and he applied the rigging to the barge and steamer and found it answered and worked well. After some time—a year or years after—the machinery was taken from the steamer and it has since run as other coupled boats with horse-power. That is why this rigging appears on the canal company's boats.

Cross-examination:

14. Do I understand from your testimony that this coup-
475 ling and steering rigging cannot be used on single boats, but must be applied to double boats specially constructed for it?

A. Yes.

15. This special construction makes these boats cost more than single boats, does it not?

A. No, sir.

16. The cost of a boat specially constructed for the reception of this rigging is no greater than that of a single boat, is it?

A. No; but it has to be constructed specially for this rigging.

Signature waived.

476 In the United States Circuit Court, Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } In Equity.

Pending before Charles Howson, Esq., master.

Edward Stabler, Jr., being duly affirmed in the above-mentioned cause, deposes and says that he is the same Edward Stabler, Jr., who gave a deposition in this cause on the twenty-sixth day of May last, before Isaac Brooks, Esq., special examiner. He further states that during the present season (1882) he has received at Baltimore, up to the present time, by boats of the Pennsylvania Canal Company, forty-five (45) cargoes of coal, in double and single boats, which double boats were all constructed and rigged in the same manner as the double boats mentioned in his said former deposition. That annexed hereto is a schedule (marked "E. S., Jr., No. 16") of all the manifests received with the said several cargoes of coal, made out in the same manner and showing the same facts as the several schedules of manifests produced and put in evidence by him on his said former examination, and which manifests for the present season he will file with the master, if required to do so.

EDWARD STABLER, JR.

Affirmed to and subscribed before me this thirteenth day of September, 1882, at the city of Baltimore, within the district of Maryland.

[SEAL.]

ROB'T LYON ROGERS,
U. S. Commissioner for Maryland.

477 EXHIBIT "E. S., JR., No. 16."

Shipments by Susquehanna Coal Co.

1882.

No. of shipment.	Date of manifest.	No. of boat.	Name of captain.	Amount of coal.		Rate of freight.	
				Double.	Single.	Double.	Single.
171	April 18	229	Leighty	131		74	
172	" 18	230	----do.	130		74	
257	" 24	273	Finley	134		74	
258	" 24	274	----do.	135		74	
506	May 8	220	Baker	133		74	
511	" 8	208	Null	133		74	
512	" 8	209	----do.	134		74	
533	" 10	255	Derr	134		74	
584	" 10	256	----do.	135		74	
624	" 17	Maggie	Sealicks		134		102
695	" 22	72	Beigh	130		74	
696	" 22	73	----do.	131		74	
1003	June 9	219	Baker	135		74	
1004	" 9	220	----do.	133		74	
1063	" 13	94	Gotshall	130		74	
1064	" 13	95	----do.	128		74	
1112	" 15	173	Nagle	133		74	
1200	" 20	254	Webb	138		74	
1318	" 27	209	Null	133		74	
1321	" 28	70	Funk	129		74	
1395	July 1	269	Eddy	135		74	
1396	" 1	270	----do.	135		74	
1507	" 11	265	Logan	131		74	
1508	" 11	266	----do.	134		74	
1561	" 13	255	Derr	134		74	
1562	" 13	256	----do.	133		74	
1655	" 19	223	Smethers	135		74	
1656	" 19	224	----do.	134		74	
1711	" 21	200	Shumaker	135		74	
1775	" 26	279	Cassatte	131		74	
1776	" 26	280	----do.	133		74	
1819	" 28	269	Eddy	133		74	
1820	" 28	270	----do.	134		74	
1871	" 31	245	Portzline	134		74	
1872	" 31	246	----do.	133		74	
2127	August 15	253	Webb	136		74	
2128	" 15	254	----do.	137		74	
2151	" 16	104	Burlingame	127		74	
2152	" 16	105	----do.	130		74	
2319	" 24	235	Mottern	133		74	
P. 12	" 24	Ernest and Nellie.	Cook		135		102
2365	" 26	191	Feltenberger	129		74	
2401	" 29	251	Fritzman	134		74	
2402	" 29	252	----do	136		74	
P. 17	" 31	Maggie	Basom		132		102

478 Defendant's counsel objects to the foregoing affidavit of J. Stabler, Jr., and accompanying exhibit on the same grounds whereon objection was made to the previous testimony of said Stabler and accompanying exhibits.

479 In the United States Circuit Court.

JOHN MCCREARY
vs.
PENNA. CANAL CO. } In Equity.

Testimony Before the Master—Continued.

COMPLAINANT'S "EXHIBIT No. 1" (Form of Boat Lease).

This agreement, made the — day of ——, anno domini one thousand eight hundred and seventy- —, between the Pennsylvania Canal Company, of the one part, and —— ——, of the other part, witnesseth:

That the said Pennsylvania Canal Company, being the owners of the canal-boat known, marked, and registered on its books as Pennsylvania Canal Company No. —, has leased and does hereby lease the same unto the said —— —— for and during the boating season of the current calendar year and thereafter upon the terms, payments, and conditions following—that is to say, that said —— —— does hereby agree to provide sufficient labor, implements, and motive-power, and to keep the said boat at all times steadily employed; to use it with proper care and attention, keep it in good repair, preserve it from damage; not to allow any alteration of its color, construction, number or appearance, and to freight coal therewith for the said Pennsylvania Canal Company under the direction of said company, its officers or agents, to any point or destination by it or them required during the continuance of this agreement, and not to freight or use said boat for any other person or persons whatsoever
480 without written consent of the said The Pennsylvania Canal Company, and not to hire, or let, or in any way or under any arrangement or pretext whatever deliver or transfer the possession of the said boat to any other person or persons, or use or freight the said boat or allow it to be used or freighted for the business of any other person or persons, party or parties, whatsoever except the said Pennsylvania Canal Company or with its written consent; and to deliver the said boat in the said company's canal basin at Nanticoke, at the close of navigation in each season, or at any other time or times during the continuance of this agreement when and as required by the said Pennsylvania Canal Company, its officers or agents.

And for the freighting of coal as aforesaid for the said The Pennsylvania Canal Company the said —— —— is to receive the current rate of freight from Nanticoke to the several points designated respectively by the said company as aforesaid; but it is expressly agreed that from any freight money which may be earned by or become due to the said —— —— the said The Pennsylvania Canal

Company may retain the monthly rent of — per cent. of the earnings of each and every trip made by the said boat for each and every month out of each trip, and a further sum of —— dollars to secure to the said Pennsylvania Canal Company the proper repair and due delivery of the said boat and the performance of each and all the other covenants and agreements which are herein expressed and agreed to be kept and performed by the said —— ——, it being expressly understood and agreed that the said The Pennsylvania Canal Company may retain for and as the monthly rent of said boat — per cent. of monthly earnings thereof, and also the further sum of —— dollars per month out of such monthly earnings, even though the said — per cent. of earnings shall not amount to that sum.

And the said —— —— does hereby, for himself, his heirs, administrators and assigns, expressly covenant and agree that he will keep and perform all and every the stipulations of this agreement which by the terms thereof are by him to be kept and performed,
481 and that in the event of any breach thereof on his part, and especially in case he shall in any way whatsoever hire, or let, or deliver possession of or transfer the said boat to any other person or persons or freight or use the said boat or allow it to be freighted or used for the business of any other person or persons, party or parties, except of the said The Pennsylvania Canal Company, without its written consent, and also in the event of any wilful disguise or alteration of the color, construction, number, or appearance of said boat, or of any judicial sale or seizure of said boat in consequence of any fault or default of the said —— ——, and in case of his failure to keep the said boat in good repair and in steady use or to deliver the same when and as required by the stipulations hereof, then and in such event or either of them all the aforesaid monthly rent and all moneys retained for rents or security as aforesaid shall be absolutely and entirely forfeited to the said The Pennsylvania Canal Company, and the said company, its successors or assigns, may forthwith resume possession of the said boat for the purpose of continuing their business without interruption, and all right of the said —— ——, his heirs, executors, administrators, or assigns, to the use or possession thereof and to any monthly rents, retained moneys, or back freights, under any of the provisions of this agreement or otherwise, shall thereupon and thereby cease and become absolutely ended, forfeited, and determined.

It is further understood and agreed that if the said —— —— shall continue to comply faithfully with this agreement and with each and all of the stipulations thereof honestly, punctually, and without default until the rents retained by the said The Pennsylvania Canal Company shall have amounted to the sum of —— dollars, with interest thereon from the date hereof, then the said The Pennsylvania Canal Company will thereupon sell and transfer the said boat to the said —— —— for the consideration of —— dollars.

Witness the hands and seals of the said parties, hereto affixed at

Wilkes Barre, Pennsylvania, on the day and year first herein written.

—— ——. [SEAL.]

In the presence of—

—— ——.

482 McCREARY *vs.* CANAL CO.

SEPTEMEBER 27, 1883.

Present: Messrs. Coombs and Johnson, for comp't; S. S. Hollingsworth, Esq., for defend't.

J. J. Coombs, of counsel for complainant, under the sanction of his professional oath, states that the double canal-boat "Sixteenth Amendment," as he has learned since the testimony and arguments before the master was closed, was in 1875 altered in accordance with John and Elijah McCreary's patent, No. 125,684, of April 16, 1872; that after said double boat was sold to the Reading Railroad Company it was found on trial to be unfit for practical use on the canal used by said company on account of its construction, the adjacent ends coming in contact vertically from top to bottom and it being impracticable to apply a rudder to the forward boat; that James Kelly, of York county, Penna., is a material witness to prove these facts, which deponent believes to be material to the case of the complainant. He further states that until some time in August, 1883, he had no knowledge of the facts herein stated and no reason to suppose such facts existed.

The defendants resists the application for the opening of the testimony—

1. Because it is not alleged that any effort was made to obtain the testimony offered before the evidence was closed before the master, nor that it could not have been obtained with ordinary diligence.

2. Because the plaintiff is estopped from claiming that the double boat in question could not be practically operated, and any evidence short of this is not material.

3. Because the alleged alteration, which it is now alleged made the boat a practically working boat, did not change it
483 into a boat like the boat described in the patent sued upon, but into a boat alleged to be like another boat older than the boat described in the patent in suit.

The master states that he will allow the proffered deposition to be presented, reserving the objections.

JAMES KELLY, being duly sworn, deposes, in answer to interrogatories propounded by J. J. COOMBS, Esq., of counsel for complainant, and says:

Question 1. State your age, residence, and occupation.

Answer. Age, 36 years; York county, Penna.; canal boatman.

Q. 2. Are you acquainted with a pair of double boats called the Sixteenth Amendment?

A. Yes, sir.

Q. 3. When did you become acquainted with that pair of boats, and to whom did it belong?

A. If I mistake not I bought those boats in 1875 or 1876 from the Philadelphia and Reading R. R. Co.

Q. 4. What was the construction of those boats when you bought them?

A. The stern of the front boat was in the shape of a half moon. There was a post at each corner of the half moon. The half moon was planked so as to close up the stern of the boat around the sides of the boat coming down to the corners of the half moon and being jointed to the stern by the corner posts.

Q. 5. Look at model now shown you and marked Defendant's Exhibit 18 and say whether or not that represents the Sixteenth Amendment as it was at the time you bought it.

A. It does all but the position of the steering rigging, which was on the front and not on the rear boat.

Q. 6. How long did you use the Sixteenth Amendment in that condition?

A. I used her, to the best of my knowledge, up to about four months, and then the boat inspector ordered me to put them
484 in the boat yard, at the close of that season, from the fact that the consignees refused to have me towed on the bay.

Q. 7. Were those boats altered; and, if so, when?

A. The winter of 1875 and 1876, if I don't mistake. The alterations were finished in the spring of 1876, I think, though it might have been 1877.

Q. 8. What alteration was made?

A. The boats were reversed end for end, and the stern of the front boat now became the bow; was changed and built up so as to present the proper shape.

Q. 9. Was there a projecting or overhanging guard on the adjacent ends of the boats after they were changed?

A. There was one on the stern of the front boat.

Q. 10. After the boat was altered did the ends of the hulls come in contact below the guards?

A. No; except where the cut-water of the rear boat ran into a notch in the overhanging guard of the front boat.

Q. 11. After the alteration did you have a rudder applied to each boat?

A. Yes.

Q. 12. How was it before this alteration?

A. I had no rudder for the stern of the front boat.

Q. 13. What did it cost to make that alteration?

A. If my memory serves me right, about $1,030.

Q. 14. Look at the model, Exhibit 17, and state whether or not that represents the Sixteenth Amendment after it had been altered.

A. Yes, sir.

Q. 15. Do you know anything about several pair of boats that the

Philadelphia and Reading R. R. Co. are running under the McCreary patent of April 16, 1872?

A. Yes.

Q. 16. How far does the Sixteenth Amendment, as now altered, correspond with the boats referred to in last question and answer?

A. They are just alike—coupled alike.

485 Q. 17. What was your reason for having the Sixteenth Amendment altered?

A. Several reasons. One was they threatened to refuse to tow me on account of no rudder—unmanageable. Another reason was in the canals, in pulling this rigging, they would pinch and bind together; that they would not turn, and oftentimes, in laying over for other boats, unmanageable; got into trouble and caused other boatmen to have bother and trouble, and then, in swelling them out of a lock, they would be so tight together that the boats would break each other for want of play.

Q. 18. You said that in certain conditions of the river you could not go, while others could; how was that?

A. Their boats were built so that each had a rudder, while I had a rudder on one boat only.

Q. 19. Did any accident ever occur to either boats from the use of the Sixteenth Amendment?

A. Yes, sir; a light boat lying at Wrightsville was run into and sunk by the Sixteenth Amendment, owing to the impossibility of knowing the latter boat quickly enough to avoid a collision.

Q. 20. The Sixteenth Amendment, before it was altered, had it any advantage for transportation of coal over an ordinary single boat?

A. Oh, it carried more tons.

Q. 21. Could you carry coal any cheaper on the Sixteenth Amendment before it was altered than you could on a good single boat, taking into consideration the risks of accidents in using said boat?

A. Nothing but compulsion would make me use that rigging or a double boat with that rigging again.

Q. 22. In the Sixteenth Amendment, before it was altered, in turning an angle or a corner, the boats would not remain centered in respect to each other, would they?

A. In turning the centers would pass away from each other.

Q. 23. What effect did that have in passing through locks?

486 A. They often broke chains and otherwise injured the boat.

Cross-examined by S. S. HOLLINGSWORTH, Esq.:

X Q. 24. When did you first see this Sixteenth Amendment?

A. Some four or five years before I bought her.

X Q. 25. Where?

A. Going down the Susquehanna canal.

X Q. 26. Do you know who owned her at that time?

A. I am not prepared to say. To the best of my knowledge John McCreary.

X Q. 27. Was she running as a coupled boat?

A. Yes; if I don't mistake.

X Q. 28. Did you ever see her again until you bought her?

A. Yes.

X Q. 29. Did you see her on and off running as a double boat during those years?

A. Yes.

X Q. 30. How did you come to think of buying her?

A. The Reading road was selling all their boats, and I was poor, and all the better boats were bought, and besides I was discouraged by the report of their boatmen as to the steering arrangement and handling of the boats.

X Q. 31. Did you ever make any calculation or careful estimate as to whether you carried coal cheaper on the Sixteenth Amendment before alteration than on single boats or not?

A. No, sir; I never kept particular accounts to compare the two.

Re-examined:

R. D. Q. 32. Did you buy the Sixteenth Amendment at the same or a less price than their other boats were sold by the Reading Co.?

A. No, sir; I got the boat for $1,610; the others were sold for $3,200.

487 Recross-examined:

X Q. 33. Do you know whether the other boats were older or younger than the Sixteenth Amendment?

A. If I don't mistake the others were some two years younger.

X Q. 34. Do you know anything about their relative condition of repair—whether the other boats were in better or as good or in worse order than the Sixteenth Amendment?

A. They were younger boats; in better order.

DEPARTMENT OF THE INTERIOR,
UNITED STATES PATENT OFFICE.

To all persons to whom these presents shall come, Greeting:

This is to certify that the annexed is a true copy from the records of this office of the only instrument of writing found of record under letter- patent 125,684 up to and including October 1, 1884, recorded in Liber J 17, page 167. Said record has been carefully compared with the original and is a correct transcript thereof.

In testimony whereof I, R. G. Dyrenforth, acting Commissioner of Patents, have caused the seal of the Patent Office to be affixed this 10th day of October, in the year of our Lord one thousand eight hundred and eighty-four, and of the Independence of the United States the one hundred and ninth.

[SEAL.] R. G. DYRENFORTH,
Acting Commissioner.

In consideration of one dollar to me paid by John McCreary, of Middletown, Dauphin county, Pennsylvania, I, Elijah McCreary, of the same place, do hereby sell and assign to the said John McCreary

all my right, title, and interest in and to certain letters patent
488 of the United States, issued to us jointly, for "improved coupling and steering device for canal boats," bearing date April 16, 1872, and No. 125,684.

Also all my right, title, and interest as assignee in and to certain letters patent of the United States, issued to the said John McCreary, for coupling and steering apparatus, bearing date July 23, 1872, No. 129,844; and I do hereby authorize and request the Commissioner of Patents to reissue the said letters patent to the said John McCreary in his own name and for his own use and benefit.

Witness my hand this 9th day of October, 1873.

ELIJAH McCREARY.

Recorded Oct. 11, 1873. Ex'd: C. F. M. V. B.

489 Circuit Court of the United States, Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL CO. } In Equity.

Complainant's Exceptions to Master's Report.

The complainant excepts to so much of the master's report as is embraced in the following paragraphs, to wit:

But the statements of the specification (of the patent in suit) are
an admission that the combination of the two boats A and B,
490 the steering chain *a* passing around sheaves or pulleys and around windlass C or its equivalent, and the overhanging guard or bumper on the stern of the forward boat was old, being shown and described in the prior patent of E. & J. McCreary, No. 125,684, and claimed therein, not in itself, but in combination with a particular device for "centering" the two boats and forming an universal joint between them, to wit, a "notch" in the overhanging guard of the forward boat, into which notch the stem or cut-water of the rear boat of the pair fits.

"The combination of the patent in suit and that of the prior patent are practically identical in function and result, and are identical in *constitution*, save only as to one particular element, the 'centering' device.

"As, therefore, the combination of the patent in suit is one the sole invention and novelty of which consisted of a single element, the profit which complainant is entitled to recover from defendant in this case is that which he may have shown to have accrued to it
from the use of substantially that new element in substanti-
491 ally the combination in which he has described and claimed it."

This exception is taken on the ground that the allegation that "the statements of the specification are an admission that 'the combination of the two boats A and B, the steering chain a,"' &c., "was old" because "shown and described in the prior patent of E. & J. McCreary, No. 125,684," is erroneous and misleading, inasmuch

as said patent of E. & J. McCreary is only three months and some days earlier in date than the patent in suit, and the complainant is and has been since the — of April, 1873, sole owner of it, which facts should have been stated in connection with the allegation aforesaid, and also upon the ground that the last paragraph above quoted contains an erroneous construction of law if it means that the complainant is not entitled to recover the entire profits which have accrued to the defendant from the use of boats containing the invention described and claimed in the patent in suit because of anything shown or described, but not claimed, in said prior patent of the complainant, No. 125,684.

492 Second exception. The complainant excepts to the following paragraph in the master's report.

"The parties are agreed that when the invention infringed is a mere improvement on an old machine the patentee is entitled to recover from the defendant the profits only which the latter has made from the use of the improvement; and, further, that it is incumbent upon the complainant, in presenting his proofs before the master, to distinguish between the profits derived from the use of the improvement and those derived from the general business of using the entire machine, including the improvement."

Whereas no such proposition has been agreed to by the complainant. The only admission of the complainant to which the master could have referred is found in a brief of his counsel before the master in the following words:

"Mr. Baldwin cites numerous authorities to prove what we distinctly admitted in our (former) brief, viz., that when the invention infringed is a mere improvement on an old machine the pat-

493 entee is entitled to recover from the defendant the profits only which the latter has made from the use of the improvement * * * as contradistinguished from those which have arisen from the use of the entire machine, including the improvement; and we admit that it is incumbent on the complainant, in presenting his proofs before the master, to distinguish between the profits derived from the use of the improvement and those derived from the general business of using the entire machine, including the improvement."

By quoting from complainant's brief a part of a sentence only as containing a proposition to which "the parties are agreed" the report is made misleading, inasmuch as no claim has been made on behalf of the complainant to profits derived by the defendant "from the general business of using the entire machine, including the improvement."

And, further, because the machine described in said patent of E. & J. McCreary was not an "old machine" within the mean-

494 ing of that part of complainant's brief from which the master quotes a part of a sentence as containing a proposition to which "the parties are agreed," whereas said brief, in the same paragraph from which the master quotes as aforesaid and in the next succeeding paragraph, clearly shows that by an "old machine" was meant a machine open to the use of the defendant.

In the same paragraph from which the master quotes is the following: "To this extent the burden of proof is admitted to be on the complainant—that is to say, unless he shows affirmatively some amount of profits (or savings) derived from the use of the machine with the improvement over and above what they had been or were or could have been derived from the use of it without the improvement, he has failed to show any definite amount of profits derived from the use of his patented invention."

The next paragraph in complainant's brief is in the following words:

In a case like this there can be but one proper way of showing definitely the profits or savings derived from the use of the patented improvement as contradistinguished from the general or gross
495 profits derived from the use of the machines containing the improvement, and that is by comparing the results obtained from the use of machines containing the improvement with those obtained from the use of similar machines not containing it. In this particular case it is comparing the cost of transporting coal in boats containing our invention with the cost of transporting the same in boats which the defendants used, or could have used, not containing it."

To quote from the complainant's brief the matter herein excepted to as containing a proposition to which "the parties are agreed," without giving the context, which clearly shows what was meant by "an old machine," is deceptive and misleading.

Third exception. The complainant excepts to the following paragraph of the master's report, to wit:

"While the proofs show that from fifty-eight pairs in 1874 the number of infringing coupled boats built and used by defendant had increased to one hundred pairs in 1881 and to one hundred and twelve pairs in 1882, they do not show exactly what num-
496 ber of new boats was added, nor exactly what number altogether of the infringing boats was in use in any one of the years between 1874 and 1881."

This exception is taken on the ground that it is unreasonable to require the complainant to show by his proofs "exactly what number of new boats was added, nor exactly what number altogether of the infringing boats was in use in any one of the years between 1874 and 1881," inasmuch as these are facts within the knowledge of the defendant alone, and its president has refused or failed to disclose them when interrogated upon said points.

Fourth exception. Complainant excepts to the finding of facts set forth in the following paragraph of the master's report, to wit:

"As to the actual number of the infringing coupled boats which have been in continuous service during any one season, the only testimony bearing upon the point is the statement of one witness that he has 'seen as many as a dozen pairs under repair at one-
497 time,' and that, 'as a general thing, there are that many laid up for repairs.'"

And he insists that there is ample proof of facts from which

said numbers may be fairly and legitimately inferred in view of the refusal of the defendant to disclose them.

Fifth exception. The complainant excepts to the finding of facts as set forth in the following paragraphs of the master's report, to wit:

"It is stated in the annual report of the president of the defendant corporation for 1874 that 'the freight transported by the company in its own boats upon the enlarged part of the canal during that year was equivalent to thirty-three million four hundred and four thousand two hundred and forty-nine tons moved one mile,' and that 'this was done in fifty-eight double and fifty-one single boats; that the average freight paid boatmen on the main line was, in double boats, five hundred and twenty-six thousandths of
498 one cent per ton per mile, and that the freights in single boats exceeded those in double boats exactly twenty-five per cent.'

"It is sufficiently proved that each pair of double boats will carry at least twice as much as each single boat. A simple computation upon the basis assuming the service performed by the two classes of boats to have been strictly proportionate to their respective capacities exhibit- a result for that year of the equivalent of twenty-three million two hundred and two thousand nine hundred and fifty-one tons moved one mile in double boats, at an expense for 'freights' of twenty-five per cent., or $30,511.88 less than it would have cost to effect the like movement in the single boats.

"If from this amount be deducted $6,990.16 (the cost of applying couplings to fifty-eight pairs of boats, the number in use in 1874), the result is an estimated net saving for that year of $23,521.72. To adopt this estimate, however, is to assume, without proof, that the relative proportion of coupled and of single boats in actual use was practically constant throughout the year, and that the conditions of the business were such that the actual amount of service respectively performed by the two kinds of boats was in
499 strict proportion to their respective capacities.

"In short, this estimate is based solely and entirely upon evidence as to the number of the respective kind of boats in use during, but not necessarily therefore throughout, the year and their average capacities. Beyond that all is conjecture; arbitrary, however plausible. For these reasons the master does not think himself at liberty to adopt this estimate as a finding."

Complainant especially excepts to the last paragraph above quoted as containing statements of facts unwarranted by the proofs, and especially to the words "beyond that all is conjecture; arbitrary, however plausible;" and he submits that what the master characterises as all arbitrary conjecture is based upon official admissions of the defendant's president and such deductions therefrom as may be verified by simple arithmetic.

And complainant insists that the master should have found the facts on this point substantially as he found them in his "draft report," from which the following is an extract:

500 "It is stated in the annual report of the president of the defendant corporation for 1874 that 'the freight transported

by the company in its own boats upon the enlarged part of the canal during that year was equivalent to 33,404,249 tons moved one mile,' and that 'this was done in 58 double and 51 single boats;' that the average freight paid boatmen on the main line was, in double boats, 526 of one cent per ton per mile, and that the freights in single boats exceeded those in double boats exactly 25 per cent.

"It is sufficiently proved that each pair of double boats carries at least twice as much as each single boat. A simple computation upon this basis exhibits a result for that year of the equivalent of 23,202,951 tons moved one mile in double boats, at an expense for 'freights' of 25 per cent., or $30,511.88 less than it would have cost to effect the like movement in the single boats.

"The master finds, therefore, that the sum of $30,511.88 was saved in the year 1874 by carrying in defendant's infringing coupled boats, instead of in its single boats."

501 Sixth exception. The complainant excepts to so much of the master's report as is embraced in the last two paragraphs thereof as follows, to wit:

"Upon the proofs before him the master cannot find that the whole value to defendant of its infringing machines has been due to the use therein of that invention in combination with the old elements which they were at liberty to use, and in combination with which complainant has claimed it.

"Consequently the master feels constrained to report that he finds no proven profits, savings, or advantages to have been received by or accrued to defendant from the manufacture, use, or sale of complainant's patented improvements."

Inasmuch as the master admits in his report that none of the prior inventions and machines mentioned in the proofs (and open to the use of the defendant) were "adapted for defendant's use with any advantage over single boats, because their construction was such that a rudder could not have been applied to the for-
502 ward boat;" and inasmuch as the said patent originally granted to E. & J. McCreary, No. 125,684, now is and during all the time of the infringements complained of has been owned by the complainant exclusively, and is the only prior machine that could have been used by the defendant "with any advantage over single boats," it is an error in law to rule that the complainant is limited in his rights to recover profits derived from the use of his patented invention in suit by reason of anything described or shown in said patent, No. 125,684.

Seventh exception. That the master erred in reporting that "he finds no proven profits, savings, or advantages to have been received by or accrued to defendant from the manufacture, use, or sale of complainant's patented improvements," whereas he should have found from the evidence that the defendant had made savings to the amount of $270,707.80 from the wrongful use of complainant's patented invention, and so reported.

Eighth exception. The complainant excepts to so much of the master's report as is embraced in the following paragraphs,
503 to wit:

,' Now, defendant might have freely used every part of the combination of complainant's patent short of the whole.

"It was at liberty to use an overhanging guard or bumper on the stern of the forward boat and to couple boats of that construction and steer them as one by means of chains, sheaves, pulleys, and windlass such as described in complainant's patent, and it is not liable to complainant in this suit for any profits, savings, or advantage which may have accrued to it from the employment of these features, severally or in combination. The profits for which it is liable *is that* which it may be proved to have derived from the combination with these features of substantially a particular 'centering device,' the chain D."

Before complainant can recover from defendant the fruits of advantages inherent in certain parts of his combination and those parts not of his invention nor patented, but open to common use, he must at least show that defendant could not have reaped any
504 part of those fruits had it not used his entire combination."

The point of this exception is that the complainant is claiming no profits derived by the defendant from the use of anything less than the "entire combination" claimed in his patent in suit, which "entire combination" the court by its decree has decided that the defendant has used, and that is not an open question before the master.

Ninth exception. Complainant excepts to all that is contained in the fourteenth and fifteenth pages of the master's report respecting the "Frick boats," the "Sixteenth Amendment," the "English patent of Bourne," and "the United States patent of Stackpole," inasmuch as the court has decided in its decree that neither of said patents or inventions contains the invention claimed by the patent in suit, and inasmuch also as the master admits that neither of said inventions was "adapted for defendant's use with any advantage over single boats." How far the defendant might have been able to make similar profits or savings to those it did make from the use of complainant's patented invention by using something less than the entire combination patented and by inventing something else to take the place of the device or devices omitted is not
505 a question to be considered, inasmuch as the court has decided that the defendant did use the entire combination patented, and the master admits that it could not have made any part of the profits or savings made thereby by the use of any other known machines or inventions open to its use.

Tenth exception. Complainant excepts to the following paragraph of the master's report, to wit:

"Admitting that so far as the profits indicate anything on the subject they indicate that the results thus reached by complainant may be and probably are within the truth; that the actual savings in freights by the use of the infringing boats have probably been greater than the estimated saving exhibited by complainant's computation, it yet seems to the master that he is not at liberty to adopt as the basis of any finding in this case a computation of which

almost every step is matter of more or less arbitrary—however probably moderate—conjecture."

The point of this exception is that the master characterizes the computations upon which the complainant bases his claim as
506 "a computation of which almost every step is matter of more or less arbitrary—however probably moderate—conjecture, whereas complainant insists that no "step" in his said computation is matter of "arbitrary conjecture," but, on the contrary, every item is based upon proven facts and such deductions therefrom as it is competent to make, in view of the impossibility of obtaining specific evidence from the defendant on subjects exclusively within its knowledge or within the knowledge of its officers.

Eleventh exception. Complainant excepts to the following paragraphs of the master's report, to wit:

"Complainant urges that the present is a case in which defendant has "withheld statements which it would seem it ought to be able to make," and has exhibited "evident unwillingness to account," and that for this reason less strictness of proof should be required of complainant than under ordinary circumstances.

"The master does not think that as to this it is necessary
507 for him to say more than that, in his opinion, the record does not show such exhaustion by complainant of the means and avenues of inquiry open to him, accompanied by such evidently wilful withholding by defendant of "statements" duly called for, as to demand or warrant such a relaxation for complainant's benefit of the rules of proof, such a supplying of the want of proof by voluntary conjecture as (it seems to him) would be involved in the finding which complainant asks."

Complainant refers to the examination of Gen. Wistar, defendant's president, commencing on page 1 and ending on page 22 of the testimony taken before the master, to show how completely he exhausted every available means of obtaining from defendant facts material to the account and how fruitless were all his efforts to obtain them from said president, and also to show his evident "unwillingness to account" and such "evidently wilful withholding by the defendant of statements duly called for" as to demand from the complainant less direct and positive evidence as to matters within the exclusive knowledge of the defendant than would otherwise be requisite to establish his claim.

508 Twelfth exception. The complainant excepts to so much of the master's report as deducts from the sum of $12,912.24, which the master admits to have been savings made by the defendant by the shipments of coal in its infringing double boats to two consignees in Baltimore during the years 1874 to 1882, both inclusive, of the sum of $8,315.88, the alleged cost of applying complainant's invention to 69 pairs of boats engaged in the traffic involved in said savings, as set forth in the following paragraph, to wit:

"The master finds proved savings to the amount of $12,278.07 by the shipment of coal in defendant's infringing double boats instead of single boats to one consignee in Baltimore during the years from 1874 to 1882, both inclusive, and savings to the amount of $634.17

by shipments to another consignee during the years from 1874 to 1881, both inclusive, making a total ascertained saving of $12,912.24.

"The number of infringing boats engaged in the traffic involving this saving appears to have been 69 pairs, and deducting $8,315.88, the cost of applying the couplings to these boats, leaves a net saving of $4,596.46."

509 Complainant insists that, inasmuch as the evidence shows that the same 69 pairs of infringing boats which were employed in carrying coal to said two consignees in Baltimore were also employed to a much larger extent in carrying coal elsewhere for defendant, it is an error to charge the complainant with the cost of applying complainant's invention to every boat engaged in carrying coal to said two consignees.

Finally, the complainant excepts to the whole of said report, except that part commencing with the second paragraph on page 9 and ending with the last paragraph on page 10 of said report, on the ground that it contains diverse erroneous constructions of the evidence and the law, as well as arguments not warranted by the evidence or the law.

J. J. COOMBS,
JOHN G. JOHNSON,
Counsel for Complainant.

510 (Endorsed:) No. 66. Oct. sess., 1873. Circuit court U. S., eastern dist. of Pa. John McCreary *vs.* The Pennsylvania Canal Co. In equity. Complainant's exceptions to master's report. Filed Jan. 12, 1885. W. von A. Williamson, *pro* clerk.

511 United States Circuit Court, Eastern District of Pennsylvania.
In Equity.

JOHN MCCREARY *vs.* THE PENNSYLVANIA CANAL CO. } No. 66. Oct. Sess., 1873. Before the Master.

Exceptions Taken by Defendant to the Second Draft Report of the Master.

I.

To so much of said second draft report as finds that "it appears from complainant's proofs that in 1874 defendant had in use fifty-eight pairs of coupled boats containing complainant's said improvement; that in 1881 this number of infringing boats was one hundred pairs and in 1882 one hundred and twelve pairs; that these boats have been used principally, if not solely, for carrying coal over defendant's canal and the waters communicating therewith; that defendant has owned and used concurrently with its coupled boats and in the same business a number (gradually decreasing,

512 it seems, since 1874) of single boats"—

Defendant excepts and respectfully submits that said finding is contrary to complainant's proofs, which (while insufficient and

indefinite as to the number of boats, double or single, in use on defendant's canal since 1874) show affirmatively that "the defendant leases its boats to boatmen who do the carrying on their own account;" that the defendant "leases its boats at so much per ton for all classes, sizes, and character of boats," and "the rate is the same for all classes and sizes;" that "the defendant is not a common carrier; has nothing to do with the freight;" "that it does not use the boats belonging to it at all," but leases them to boatmen, and that "the lessees make the bargains with the shippers for the freight;" that "the contracts for freight are made by the agents of the sales agents, who take up the boats and agree for the freight," and that "the defendant does not run any boats itself and never did, except repair flats, dredgers, &c."

Wherefore defendant submits that it is error for the master to find upon the proofs, as he does find in effect, that defendant has used its boats in the business of carrying coal, or that defendant has been engaged in the coal-carrying business, or has been
513 a freight carrier, and the master should amend and correct said finding accordingly.

II.

To the following finding of said second draft report, to wit:

"Under these circumstances the difference between double and single boat freight rates, as representing the extent to which the canal transportation was cheapened to defendant's direct advantage by the adoption and use of the infringing boats, might, it would seem, well be taken as the measure of the profits, savings, or advantages accruing to defendant itself from that use"—

Defendant excepts and respectfully submits that this finding is erroneous and not supported by the premises from which it is deduced—

First. Because the proofs show that the defendant had nothing to do with the freight, and as to its tolls and rentals the rate was the same for all classes and sizes and character of boats; that the defendant does not gain or lose a cent by either one over the other kind of boat, and that it never gained or saved a dollar by the use of double boats.

514 Second. Because the "measure of the profits, savings, or advantages" which the master establishes in said finding is based upon speculative and consequential estimates, which would apply equally to any other double boats as well as to the infringing boats in question in this case, and such measure could therefore be applied as frequently as any other improvements in double boats were under consideration; and, third, because the master has undertaken to charge the defendant with a difference in freight between two classes of boats when it is proved that so far as defendant was concerned, directly or indirectly, there was no difference in its receipts from the boats of one class over the receipts from those of the other class, its only receipts being a uniform rate of tonnage, and that tonnage being entirely distinct from the freight, the boatman

or lessee paying the tonnage rental to the defendant, and the shipper or consignee paying the freight to the boatman or lessee.

Wherefore defendant submits that the master should amend his said second draft report by making it conform to the facts of this case and by omitting the inferential and consequential premises upon which he bases said finding.

515 III.

To the following finding of said second draft report, to wit:

"The master therefore finds an ascertained saving, accruing to defendant, of $4,596.61, from the carrying of coal in its infringing coupled boats instead of its single boats"—

Defendant excepts because it is clearly proved that defendant carried no coal in any of its boats; it is clearly proved that the defendant had nothing to do with the saving in freight upon which the master computes this finding, and it is clearly error for the master to charge the defendant with said balance or with any part of the total saving (fixed in a previous finding at $12,912.24) realized by the defendant's les-ees in carrying coal to Baltimore, which is not on the line of defendant's canal; wherefore, and for other obvious reasons, defendant submits the master should amend his second draft report accordingly.

IV.

To the finding of said second draft report which adopts com-
516 plainant's assumption that the "Experiment" and the "Sixteenth Amendment" were not adapted for defendant's use with any advantage over single boats, because their construction was such that a rudder could not be applied to the forward boat, defendant excepts because no towing was required on defendant's canal, and defendant therefore would not have to separate the boats, and because, so far as carrying capacity is concerned and economy in freight is involved, the complainant himself proves the "Sixteenth Amendment" was a success on the canal, whatever might be its defects at sea, and the master should qualify said finding accordingly.

V.

And to the following finding of said second draft report, to wit:

"The same defect which unfitted" "the Experiment" and "the Sixteenth Amendment" for "defendant's use would attach to coupled boats such as these described in the English patent of Bartholomew and Bourne, referred to by the defendant as showing other prior systems of coupled boats which it might have freely used"—

517 Defendant excepts because "the Experiment" and "the Sixteenth Amendment" were not unfitted for defendant's use upon its own canals, and because Bourne's English patent describes the use of coupled boats with convex ends, which would admit of the application of a rudder, so as to steer either boat when separated

from the other; wherefore defendant submits the master should modify said findings accordingly.

The defendant further submits that the master should discard from his said report the following finding, to wit:

"The master finds proved savings to the amount of $12,278.07 by the shipment of coal in defendant's infringing double boats instead of single boats to one consignee in Baltimore during the years from 1874 to 1882, both inclusive, and savings to the amount of $634.17 by shipments to another consignee during the years from 1874 to 1881, both inclusive, making a total ascertained saving of $12,912.24"—

Because said finding is based upon incompetent testimony and because it is clearly erroneous, in that it charges to defendant freight earned by third parties; the defendant, not a carrier and not running boats to Baltimore, is charged with freight earned by boatmen
518 entirely independent of the defendant's control and in a business entirely foreign to defendant's province. It is plainly not a sound proposition that if A rents or leases his boat to B at a fixed royalty per ton of freight transported over A's canal and B carries the boat into other waters and there earns an increased freight without paying A any additional royalty or tonnage A may be held to have realized more than B paid him for the rent of the boat.

Wherefore and for other reasons the defendant submits that the master should amend his second draft report accordingly.

Respectfully, HENRY BALDWIN, JR.,
Counsel for Def'd't.

Philadelphia, Nov. 8th, 1884.

519 (Endorsed:) Circuit court of the United States, eastern D. of Pa. No. 66. October sess., 1873. John McCreary *vs.* Penna. Canal Co. In equity. Defendant's exceptions to master's report. Filed Jan. 12, 1885. W. von A. Williamson, *pro* clerk.

520 And afterwards, to wit, on the 28th day of October, A. D. 1885, this cause come on to be heard upon exceptions to master's report, and, being fully argued by counsel for the respective parties, the court takes the same under advisement.

And afterwards, to wit, on the 25th day of May, A. D. 1886, the court enters the following decree:

521 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit. In Equity.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } No. 66. Oct. Sessions, 1873.

This cause came on to be heard and was argued by counsel, and thereupon, upon consideration thereof, it was ordered, adjudged, and decreed as follows, namely:

That there are no profits and no damages due and payable to the plaintiff from the defendant arising from the use by the defendant of the invention described and claimed in reissued letters patent of the United States No. 5630, owned by the plaintiff.

It is further ordered, adjudged, and decreed that the defendant pay all the costs of the suit except the costs of accounting before the master and except the costs on the exceptions to the master's
522 report.

It is further ordered, adjudged, and decreed that the plaintiff pay the costs of accounting before the master and the costs on the exceptions to the master's report.

(Endorsed:) No. 66. Oct. sess., 1873. U. S. C. C., E. D. of Pa. McCreary *vs.* Pennsylvania Canal Co. Decree. Filed 25 May, 1886. W. von A. Williamson, *pro* clerk.

523 And afterwards, to wit, on the 30th day of November, A. D. 1886, the complainant, by his attorney, J. G. Johnson, Esq., comes into court here and files the following motion in the words and figures following:

McCREARY *vs.* PENNA. CANAL CO. } U. S. C. C., E. D. of Pa. No. 66. Oct. Sess., 1873.

And now, November 30, 1886, complainant moves the court to amend the decree entered May 25, 1886, so that the defendant shall be ordered to pay all the costs of the suit without any exception, in accordance with the conditions imposed upon it by the decree entered Aug. 7, 1875.

Complainant further moves the court to amend said decree of May 25, 1886, so that defendant may be enjoined from mak-
524 ing, using, or vending the invention described in complainant's letters patent as set forth in the bill.

(Endorsed:) No. 66. Oct. sess., 1873. U. S. C. C., E. D. of Pa. McCreary *vs.* Penna. Canal Co. Motion to amend decree. Filed 30 Nov., 1886. Samuel Bell, clerk. J. G. Johnson, for comp't.

525 And afterwards, to wit, on the 14th day of December, A. D. 1886, the court makes the following order, viz:

McCREARY *vs.* PENNA. CANAL CO. } C. C. U. S., E. D. of Penna. No. 66. Oct. Sess., 1873. In Equity.

And now, Dec. 14th, 1886, this case having come on to be heard on the motion of the plaintiff to amend the final decree of May 25th, 1886, it is ordered, adjudged, and decreed that so much of said motion as prays for an amendment of the decree enjoining the defendants as prayed for in the bill is denied, without prejudice to any right the complainant may have to file a bill of review, and that so much

of said motion as relates to costs is allowed (the defendant
526 consenting to such order, but without prejudice to any right he may have to resist any change in the original decree); and it is now ordered and decreed that the defendants pay all the costs of the suit.

(Endorsed:) No. 66. U. S. C. C., E. D. of Penna. Oct. sess., 1873. McCreary *vs.* Penna. Canal Co. Order. Filed 14 Dec., 1886. Samuel Bell, clerk.

And afterwards, to wit, on the 17 day of February, A. D. 1888, the complainant, by his attorney, comes into court here and
527 prays an appeal to the Supreme Court of the U. S. in the words and figures following, viz:

Circuit Court of the United States for the Eastern District of Pennsylvania.

JOHN MCCREARY
vs.
PENNSYLVANIA CANAL COMPANY. } No. 66. October Sess., 1873.

And now, February 17, 1888, complainant moves for permission to take an appeal from the decree entered in above-stated case, that there are no profits and no damages due and payable to the plaintiff from the defendant, to the Supreme Court of the United States.

WM. B. LAMBERTON,
Att'y for Complainant.

Whereupon the appeal is allowed with security in the sum of one thousand dollars ($1,000).

528 (Endorsed:) 66. Oct. sess., 1873. U. S. C. C., E. D. of Pa. McCreary *vs.* Pennsylvania Canal Co. Order. Appeal to U. S. S. C. Filed Feb. 17, 1888. Samuel Bell, clerk.

529 In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit.

JOHN MCCREARY
vs.
PENNSYLVANIA CANAL COMPANY. } No. 66. October Sess., 1873.

Know all men by these presents that we, John McCreary, of the borough of Middletown, county of Dauphin & State of Pennsylvania, John W. Rife and A. Moyer, of the same place, are held and firmly bound unto the above-named The Pennsylvania Canal Company in the sum of one thousand dollars, to be paid to the said The Pennsylvania Canal Company, their certain attorney, executors, administrators, or assigns; to which payment, well and truly to be made, we bind ourselves, our respective heirs, executors, and administrators, jointly and severally, by these presents.

Sealed with our seals and dated this thirtieth day of January, A. D. 1888.

Whereas lately, at a circuit court of the United States in and for

the eastern district of Pennsylvania, in the third circuit, in a suit depending in the said court between John McCreary and the Pennsylvania Canal Company, a final decree was rendered, and the said John McCreary having taken an appeal, which appeal has been allowed by the said circuit court, to the Supreme Court of the United States to reverse the said decree in the aforesaid suit:

530 Now, the condition of this obligation is such that if the said John McCreary shall prosecute his said appeal to effect and answer all damages and costs if he fail to make his appeal good, then this obligation to be null and void; otherwise to remain in full force and virtue.

JOHN McCREARY. [SEAL.]
JOHN W. RIFE. [SEAL.]
A. MOYER. [SEAL.]

Sealed and delivered in the presence of—
ELIJAH McCREARY.

Approved.
WM. BUTLER, *Judge.*

[Endorsed:] No. 66. October sess., 1873. Circuit court United States. McCreary *vs.* Pennsylvania Canal Co. Bond *sur* appeal. Approved and filed Feb. 17, 1888. Samuel Bell, clerk.

Jan'y 30, 1888.—I certify that the sureties on the within bond are sufficient for the amount named in the bond.

J. W. SIMONTON, *P. J.*

531 THE UNITED STATES OF AMERICA, *ss:*

To the Pennsylvania Canal Company, Greeting:

You are hereby cited and admonished to be and appear at a Supreme Court of the United States, to be holden at Washington on the second Monday of October next, pursuant to an appeal filed in the clerk's office of the circuit court of the United States for the eastern district of Pennsylvania, in the third circuit, wherein John McCreary — appellant and you are appellee, to show cause, if any there be, why the decree rendered against said appellant, as in said appeal mentioned, shall not be corrected and why speedy justice should not be done to the parties in that behalf.

Witness my hand this 17th day of February, in the year of our Lord one thousand eight hundred and eighty-eight.

WM. BUTLER, *Judge.*

I accept service of the above.

S. S. HOLLINGSWORTH,
For Appellee.

I request my appearance to be so entered.
Feb'y 17, 1888.

532 UNITED STATES OF AMERICA, } *sct:*
Eastern District of Pennsylvania, }

I, Samuel Bell, clerk of the circuit court of the United States of America for the eastern district of Pennsylvania, in the third circuit, do hereby certify the foregoing to be a true and faithful copy of the original pleas and proceedings in the case of John McCreary *vs.* Pennsylvania Canal Company, No. 66, October session, 1873, on file and now remaining among the records of the said court in my office.

Seal U. S. Circuit Court, E. D. Pennsylvania.

In testimony whereof I have hereunto subscribed my name and affixed the seal of the said court, at Philadelphia, this 30th day of April, in the year of our Lord one thousand eight hundred and eighty-eight and of the Independence of the United States the one hundred and 12th.

SAMUEL BELL, *Clerk of C. C.*

Endorsed on cover: E. Pennsylvania C. C. U. S. No. 368. John McCreary, appellant, *vs.* The Pennsylvania Canal Company. Filed May 26th, 1888.

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JAMES H. McKE
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IN THE

Supreme Court of the United States.

OCTOBER TERM, 1891.

No. 54.

JOHN McCREARY, Appellant,

vs.

THE PENNSYLVANIA CANAL COMPANY.

BRIEF OF

CHARLES SIDNEY WHITMAN,

For the Appellant.

IN THE

Supreme Court of the United States.

October Term, 1891.

JOHN MCCREARY, *Appellant*,
vs.
THE PENNSYLVANIA CANAL CO. } No. 54.

STATEMENT OF THE CASE.

This is an appeal from the decree in equity of the Circuit Court of the United States for the Eastern District of Pennsylvania, that there are no profits and no damages due and payable to the plaintiff from the defendant arising from the use by the defendant of the invention described and claimed in the reissued patent number 5,630, owned by the complainant.

The case is a suit upon the letters patent for coupling and steering apparatus originally granted as number 129,844 on July 23, 1872, and reissued as number 5,630 October 28, 1873.

The bill of complaint (printed record, p. 1), is in the usual form of such bills, and alleges that John McCreary, the appellant, was the original and first inventor of the invention patented; charges that the defendant has infringed the invention patented, and prays in the customary form for an injunction and account of

profits. An answer and supplemental answer was filed by the defendant (printed record, pp. 4 and 9), and the usual general replication by the complainant (printed record, p. 8). Testimony having been taken on behalf of the complainant (printed record, pp. 11 to 107), and on behalf of the defendant (printed record, pp. 107 to 177), the cause came on to be heard upon the pleadings and proofs, and having been argued by counsel for the respective parties was taken under advisement by the court.

The opinion and interlocutory decree are as follows (printed record, pp. 178–180):

"*Per curiam:*

"The bill here is founded upon a reissued patent to the complainant for 'improvement in coupling and steering canal-boats.'

"This reissue is alleged to be invalid as being for a different invention from that described in the original patent. The difference between the two patents consists in a slight change in the points of attachment of the coupling and centering chains 'D' to the stern of the forward boat, which appears only in the drawing attached to the reissue. It is altogether immaterial, inasmuch as the mode of operation, the manner of construction, or the function performed *are* not in anywise affected.

"The remaining defences do not require a detailed discussion. It must suffice to say that they are not sustained.

"The allegation of infringement is supported by satisfactory evidence which the respondent's proofs have not overthrown, and none of the prior patents exhibited cover the complainant's invention.

"There must, therefore, be a decree for the complainant, but inasmuch as the allowance of an injunction would cause much greater injury to the respondent than benefit to the complainant the decree will be only for an account.

"(Endorsed:) No. 66. October sess., 1873. C. C. U. S., E. D. of Pa. McCreary *vs.* The Penna. Canal Co. Opinion. Filed October 28, 1880.

"Circuit Court of the United States, Eastern District of Pennsylvania.

"JOHN MCCREARY
vs.
"THE PENNSYLVANIA CANAL COMPANY. } In Equity.

"This cause, at a former term of this court, having come on to be heard upon the bill, answer, replication, testimony, and exhibits, and having been argued by counsel, it is now ordered and decreed by the court that the complainant's reissued patent in the bill described is good and valid in law.

"That the said John McCreary was the first and original inventor and discoverer of the invention described and claimed in said patent and the specifications annexed thereto and is the exclusive owner of said patent.

"That the said Pennsylvania Canal Company, defendant herein, has infringed upon said patent and upon the exclusive rights of the complainant under the same—that is to say, by making and using one or more pairs of coupled canal boats, as charged in said bill of complaint.

"And it is further ordered, adjudged, and decreed that the complainant do recover of the defendant the profits, gains, and advantages which the said defendant has received or made or which have arisen or accrued to it from the said infringement of said patent by the manufacture, use, or sale of coupled canal boats, as described and secured by the said patent, since the date of said patent.

"And it is further ordered, adjudged, and decreed that the said complainant do recover of the defendant his costs and charges and disbursements in this suit, to be taxed.

"And it is further ordered, adjudged, and decreed that it be referred to Charles Howson, Esq., master, residing in the city of Philadelphia, to ascertain and take and state and report to the court the number of pairs of coupled canal boats made, sold, or used by said defendant, and also the gains, profits, and advantages which the said defendant has received or which have arisen or accrued to it since the date of said reissued patent infringing the said exclusive rights of the said complainant by the manufacture, use, and sale of the said improve-

ments patented in the said letters patent, and also an account of the damages sustained by the said complainant by reason of said infringements.

"And it is further ordered, adjudged, and decreed that the complainant on such accounting have the right to cause an examination of the officers and agents of said defendant, *ore tenus* or otherwise, and also the production of the books, vouchers, and documents before said master from time to time as said master shall direct.

"By the court.

"(Endorsed:) U. S. C. C. No. 66. Oct. sess., 1873. In equity. John McCreary *v.* Penna. Canal Co. Decree. Entered & filed October 28, 1880."

The case was presented before the master by Messrs. J. J. Coombs and J. C. Johnson for the complainant, and by Messrs. Henry Baldwin and S. S. Hollingsworth for the defendant.

The master in his report found ascertained savings accruing to defendant of $4,596.61 from carrying coal in its infringing coupled boats instead of its single boats, but reported that he found "no proven profits, savings, or advantages to have been received by or accrued to defendant from the manufacture, use, or sale of the complainant's patented improvements." (Printed record, p. 180.)

The cause came on to be heard on exceptions to the master's report, and the court entered the following decree, and order on motion to amend.

"In the Circuit Court of the United States in and for the Eastern District of Pennsylvania, in the Third Circuit. In Equity.

JOHN MCCREARY
vs.
THE PENNSYLVANIA CANAL COMPANY. } No. 66. Oct. Sessions, 1873.

"This cause came on to be heard and was argued by

counsel, and thereupon, upon consideration thereof, it was ordered, adjudged, and decreed as follows, namely:

"That there are no profits and no damages due and payable to the plaintiff from the defendant arising from the use by the defendant of the invention described and claimed in reissued letters patent of the United States No. 5,630, owned by the plaintiff.

"It is further ordered, adjudged, and decreed that the defendant pay all the costs of the suit except the costs of accounting before the master and except the costs on the exceptions to the master's report.

"It is further ordered, adjudged, and decreed that the plaintiff pay the costs of accounting before the master and the costs on the exceptions to the master's report.

"(Endorsed:) No. 66. Oct. sess., 1873. U. S. C. C., E. D. of Pa. McCreary *vs.* Pennsylvania Canal Co. Decree. Filed 25 May, 1886. W. von A. Williamson, *pro* clerk.

"And afterwards, to wit, on the 30th day of November, A. D. 1886, the complainant, by his attorney, J. G. Johnson, Esq., comes into court here and files the following motion in the words and figures following:

"McCREARY *vs.* "PENNA. CANAL CO. } U. S. C. C., E. D. of Pa. No. 66. Oct. Sess., 1873.

"And now, November 30, 1886, complainant moves the court to amend the decree entered May 25, 1886, so that the defendant shall be ordered to pay all the costs of the suit without any exception, in accordance with the conditions imposed upon it by the decree entered Aug. 7, 1875.

"Complainant further moves the court to amend said decree of May 25, 1886, so that defendant may be enjoined from making, using, or vending the invention described in complainant's letters patent as set forth in the bill.

"(Endorsed:) No. 66. Oct. sess., 1873. U. S. C. C., E. D. of Pa. McCreary *vs.* Penna. Canal Co. Motion to amend decree. Filed 30 Nov., 1886. Samuel Bell, clerk. J. G. Johnson, for comp't.

"And afterwards, to wit, on the 14th day of December, A. D. 1886, the court makes the following order, viz.:

"McCREARY *vs.* "PENNA. CANAL CO. } C. C. U. S., E. D. of Penna. No. 66. Oct. Sess., 1873. In Equity.

"And now, Dec. 14th, 1886, this case having come on to be heard on the motion of the plaintiff to amend the final decree of May 25th, 1886, it is ordered, adjudged, and decreed that so much of said motion as prays for an amendment of the decree enjoining the defendants as prayed for in the bill is denied, without prejudice to any right the complainant may have to file a bill of review, and that so much of said motion as relates to costs is allowed (the defendant consenting to such order, but without prejudice to any right he may have to resist any change in the original decree); and it is now ordered and decreed that the defendants pay all the costs of the suit.

"(Endorsed:) No. 66. U. S. C. C., E. D. of Penna. Oct. sess., 1873. McCreary *vs.* Penna. Canal Co. Order. Filed 14 Dec., 1886. Samuel Bell, clerk."

SPECIFICATION OF ERRORS.

The court below erred in adjudging that there are no profits and no damages due and payable to the plaintiff from the defendant arising from the use by the defendant of the invention described and claimed in reissued letters patent of United States, No. 5,630.

The exceptions to the master's report were as follows:

"Circuit Court of the United States, Eastern District of Pennsylvania.

"JOHN McCREARY *vs.* "THE PENNSYLVANIA CANAL CO. } In Equity.

"Complainant's Exceptions to Master's Report.

"The complainant excepts to so much of the master's report as is embraced in the following paragraphs, to wit:

"'But the statements of the specification (of the patent in suit) are an admission that the combination of the two boats A and B, the steering chain *a* passing around sheaves or pulleys and around windlass C or its equivalent, and the overhanging guard or bumper on the stern of the forward boat was old, being shown and described in the prior patent of E. & J. McCreary, No. 125,684, and claimed therein, not in itself, but in combination with a particular device for "centering" the two boats and forming an universal joint between them, to wit, a "notch" in the overhanging guard of the forward boat, into which notch the stem or cut-water of the rear boat of the pair fits.

"'The combination of the patent in suit and that of the prior patent are practically identical in function and result, and are identical in *constitution*, save only as to one particular element, the 'centering' device.

"'As, therefore, the combination of the patent in suit is one the sole invention and novelty of which consisted of a single element, the profit which complainant is entitled to recover from defendant in this case is that which he may have shown to have accrued to it from the use of substantially that new element in substantially the combination in which he has described and claimed it.'

"This exception is taken on the ground that the allegation that 'the statements of the specification are an admission that 'the combination of the two boats A and B, the steering chain a,'' &c., 'was old' because 'shown and described in the prior patent of E. & J. McCreary, No. 125,684,' is erroneous and misleading, inasmuch as said patent of E. & J. McCreary is only three months and some days earlier in date than the patent in suit, and the complainant is and has been since the — of April, 1873, sole owner of it, which facts should have been stated in connection with the allegation aforesaid, and also upon the ground that the last paragraph above contains an erroneous construction of law if it means that the complainant is not entitled to recover the entire profits which have accrued to the defendant from the use of the boats containing the invention described and claimed in the patent in suit because of anything shown or described, but not claimed, in said prior patent of the complainant, No. 125,684.

"Second exception. The complainant excepts to the following paragraph in the master's report:

"'The parties are agreed that when the invention infringed is a mere improvement on an old machine the patentee is entitled to recover from the defendant the profits only which the latter has made from the use of the improvement; and, further, that it is incumbent upon the complainant, in presenting his proofs before the master, to distinguish between the profits derived from the use of the improvement and those derived from the general business of using the entire machine, including the improvement.'

"Whereas no such proposition has been agreed to by the complainant. The only admission of the complainant to which the master could have referred is found in a brief of his counsel before the master in the following words:

"'Mr. Baldwin cites numerous authorities to prove what we distinctly admitted in our (former) brief, viz., that when the invention infringed is a mere improvement on an old machine the patentee is entitled to recover from the defendant the profits only which the latter has made from the use of the improvement * * * as contradistinguished from those which have arisen from the use of the entire machine, including the improvement; and we admit that it is incumbent on the complainant, in presenting his proofs before the master, to distinguish between the profits derived from the use of the improvement and those derived from the general business of using the entire machine, including the improvement.'

"By quoting from complainant's brief a part of a sentence only as containing a proposition to which 'the parties are agreed' the report is made misleading, inasmuch as no claim has been made on behalf of the complainant to profits derived by the defendant 'from the general business of using the entire machine, including the improvement.'

"And, further, because the machine described in said patent of E. & J. McCreary was not an 'old machine' within the meaning of that part of complainant's brief from which the master quotes a part of a sentence as containing a proposition to which 'the parties are

agreed,' whereas said brief, in the same paragraph from which the master quotes as aforesaid and in the next succeeding paragraph, clearly shows that by an 'old machine' was meant a machine open to the use of the defendant.

"In the same paragraph from which the master quotes is the following: 'To this extent the burden of proof is admitted to be on the complainant—that is to say, unless he shows affirmatively some amount of profits (or savings) derived from the use of the machine with the improvement over and above what they had been or were or could have been derived from the use of it without the improvement, he has failed to show any definite amount of profits derived from the use of his patented invention.'

"The next paragraph in complainant's brief is in the following words:

"'In a case like this there can be but one proper way of showing definitely the profits or savings derived from the use of the patented improvement as contradistinguished from the general or gross profits derived from the use of the machines containing the improvement, and that is by comparing the results obtained from the use of machines containing the improvement with those obtained from the use of similar machines not containing it. In this particular case it is comparing the cost of transporting coal in boats containing our invention with the cost of transporting the same in boats which the defendants used, or could have used, not containing it.'

"To quote from the complainant's brief the matter herein excepted to as containing a proposition to which 'the parties are agreed,' without giving the context, which clearly shows what was meant by 'an old machine,' is deceptive and misleading.

"Third exception. The complainant excepts to the following paragraph of the master's report, to wit:

"'While the proofs show that from fifty-eight pairs in 1874 the number of infringing coupled boats built and used by defendant had increased to one hundred pairs in 1881 and to one hundred and twelve pairs in 1882, they do not show exactly what number of new boats was added, nor exactly what number altogether of the infringing boats was in use in any one of the years between 1874 and 1881.'

"This exception is taken on the ground that it is unreasonable to require the complainant to show by his proofs 'exactly what number of new boats was added, nor exactly what number altogether of the infringing boats was in use in any one of the years between 1874 and 1881,' inasmuch as these are facts within the knowledge of the defendant alone, and its president has refused or failed to disclose them when interrogated upon said points.

"Fourth exception. Complainant excepts to the finding of facts set forth in the following paragraph of the master's report, to wit:

"'As to the actual number of the infringing coupled boats which have been in continuous service during any one season, the only testimony bearing upon the point is the statement of one witness that he has 'seen as many as a dozen pairs under repair at one time,' and that 'as a general thing, there are that many laid up for repairs.'

"And he insists that there is ample proof of facts from which said numbers may be fairly and legitimately inferred in view of the refusal of the defendant to disclose them.

"Fifth exception. The complainant excepts to the finding of facts as set forth in the following paragraphs of the master's report, to wit:

"'It is stated in the annual report of the president of the defendant corporation for 1874 that 'the freight transported by the company in its own boats upon the enlarged part of the canal during that year was equivalent to thirty-three million four hundred and four thousand two hundred and forty-nine tons moved one mile,' and that 'this was done in fifty-eight double and fifty-one single boats; that the average freight paid boatmen on the main line was, in double boats, five hundred and twenty-six thousandths of one cent per ton per mile, and that the freights in single boats exceeded those in double boats exactly twenty-five per cent.'

"'It is sufficiently proved that each pair of double boats will carry at least twice as much as each single boat. A simple computation upon the basis, assuming the service performed by the two classes of boats to have been strictly proportionate to their respective capacities, exhibits a result for that year of the equivalent of twenty-

three million two hundred and two thousand nine hundred and fifty-one tons moved one mile in double boats at an expense for 'freights' of twenty-five per cent., or $30,511.88 less than it would have cost to effect the like movement in the single boats.

"'If from this amount be deducted $6,990.16 (the cost of applying couplings to fifty-eight pairs of boats, the number in use in 1874), the result is an estimated net saving for that year of $23,521.72. To adopt this estimate, however, is to assume, without proof, that the relative proportion of coupled and of single boats in actual use was practically constant throughout the year, and that the conditions of the business were such that the actual amount of service respectively performed by the two kinds of boats was in strict proportion to their respective capacities.

"'In short, this estimate is based solely and entirely upon evidence as to the number of the respective kind of boats in use during, but not necessarily therefore throughout, the year and their average capacities. Beyond that all is conjecture; arbitrary, however plausible. For these reasons the master does not think himself at liberty to adopt this estimate as a finding.'

"'Complainant especially excepts to the last paragraph above quoted as containing statements of facts unwarranted by the proofs, and especially to the words 'beyond that all is conjecture; arbitrary, however plausible;' and he submits that what the master characterizes as all arbitrary conjecture is based upon official admissions of the defendant's president and such deductions therefrom as may be verified by simple arithmetic.

"And complainant insists that the master should have found the facts on this point substantially as he found them in his 'draft report,' from which the following is an extract:

"'It is stated in the annual report of the president of the defendant corporation for 1874 that 'the freight transported by the company in its own boats upon the enlarged part of the canal during that year was equivalent to 33,404,249 tons moved one mile,' and that 'this was done in 58 double and 51 single boats; that the average freight paid boatmen on the main line was, in double boats, 526 of one cent per ton per mile, and that the

freights in single boats exceeded those in double boats exactly 25 per cent.'

"'It is sufficiently proved that each pair of double boats carries at least twice as much as each single boat. A simple computation upon this basis exhibits a result for that year of the equivalent of 23,202,951 tons moved one mile in double boats, at an expense for 'freights' of 25 per cent., or $30,511.88 less than it would have cost to effect the like movement in single boats.

"'The master finds, therefore, that the sum of $30,511.88 was saved in the year 1874 by carrying in defendant's infringing coupled boats instead of in its single boats.'

"Sixth exception. The complainant excepts to so much of the master's report as is embraced in the last two paragraphs thereof as follows, to wit:

"'Upon the proofs before him the master can not find that the whole value to defendant of its infringing machines has been due to the use therein of that invention in combination with the old elements which they were at liberty to use, and in combination with which complainant has claimed it.

"'Consequently the master feels constrained to report that he finds no proven profits, savings, or advantages to have been received by or accrued to defendant from the manufacuture, use, or sale of complainant's patented improvements.'

"Inasmuch as the master admits in his report that none of the prior inventions and machines mentioned in the proofs (and open to the use of the defendant) were 'adapted for defendant's use with any advantage over single boats, because their construction was such that a rudder could not have been applied to the forward boat;' and inasmuch as the said patent originally granted to E. & J. McCreary, No. 125,684, now is and during all the time of the infringements complained of has been owned by the complainant exclusively, and is the only prior machine that could have been used by the defendant 'with any advantage over single boats,' it is an error in law to rule that the complainant is limited in his rights to recover profits derived from the use of his patented invention in suit by reason of anything described or shown in said patent, No. 125,684.

"Seventh exception. That the master erred in report-

ing that 'he finds no proven profits, savings, or advantages to have been received by or accrued to defendant from the manufacture, use, or sale of complainant's patented improvements,' whereas he should have found from the evidence that the defendant had made savings to the amount of $270,707.80 from the wrongful use of complainant's patented invention, and so reported.

"Eighth exception. The complainant excepts to so much of the master's report as is embraced in the following paragraphs, to wit:

"'Now, defendant might have freely used every part of the combination of complainant's patent short of the whole.

"'It was at liberty to use an overhanging guard or bumper on the stern of the forward boat and to couple boats of that construction and steer them as one by means of chains, sheaves, pulleys, and windlass such as described in complainant's patent, and it is not liable to complainant in this suit for any profits, savings, or advantage which may have accrued to it from the employment of these features, severally or in combination. The profits for which it is liable *is that* which it may be proved to have derived from the combination with these features of substantially a particular 'centering device', the chain D.'

"Before complainant can recover from defendant the fruits of advantages inherent in certain parts of his combination and those parts not of his invention nor patented, but open to common use, he must at least show that defendant could not have reaped any part of those fruits had it not used his entire combination.'

"The point of this exception is that the complainant is claiming no profits derived by the defendant from the use of anything less than the 'entire combination' claimed in his patent in suit, which 'entire combination' the court by its decree has decided that the defendant has used, and that is not an open question before the master.

"Ninth exception. Complainant excepts to all that is contained in the fourteenth and fifteenth pages of the master's report respecting the 'Frick boats,' the 'Sixteenth Amendment,' the 'English patent of Bourne,' and 'United States patent of Stackpole,' inasmuch as

the court has decided in its decree that neither of said patents or inventions contains the invention claimed by the patent in suit, and inasmuch also as the master admits that neither of said inventions was 'adapted for defendant's use with any advantage over single boats.' How far the defendant might have been able to make similar profits or savings to those it did make from the use of complainant's patented invention by using something less than the entire combination patented and by inventing something else to take the place of the device or devices omitted is not a question to be considered, inasmuch as the court has decided that the defendant did use the entire combination patented, and the master admits that it could not have made any part of the profits or savings made thereby by the use of any other known machines or inventions open to its use.

"Tenth exception. Complainant excepts to the following paragraph of the master's report, to wit:

"'Admitting that so far as the profits indicate anything on the subject they indicate that the results thus reached by complainant may be and probably are within the truth; that the actual savings in freights by the use of the infringing boats have probably been greater than the estimated saving exhibited by complainant's computation, it yet seems to the master that he is not at liberty to adopt as the basis of any finding in this case a computation of which almost every step is matter of more or less arbitrary—however probably moderate—conjecture.'

"The point of this exception is that the master characterizes the computations upon which the complainant bases his claim as 'a computation of which almost every step is matter of more or less arbitrary—however probably moderate—conjecture, whereas complainant insists that no 'step' in his said computation is matter of 'arbitrary conjecture,' but, on the contrary, every item is based upon proven facts and such deductions therefrom as it is competent to make, in view of the impossibility of obtaining specific evidence from the defendant on subjects exclusively within its knowledge or within the knowledge of its officers.

"Eleventh exception. Complainant excepts to the following paragraph of the master's report, to wit:

"'Complainant urges that the present is a case in which

defendant has 'withheld statements which it would seem it ought to be able to make,' and has exhibited 'evident unwillingness to account,' and that for this reason less strictness of proof should be required of complainant than under ordinary circumstances.

"'The master does not think that as to this it is necessary for him to say more than that, in his opinion, the record does not show such exhaustion by complainant of the means and avenues of inquiry open to him, accompanied by such evidently willful withholding by defendant of 'statements' duly called for, as to demand or warrant such a relaxation for complainant's benefit of the rules of proof, such a supplying of the want of proof by voluntary conjecture as (it seems to him) would be involved in the finding which complainant asks.'

"Complainant refers to the examination of Gen. Wistar, defendant's president, commencing on page 1 and ending on page 22 of the testimony taken before the master, to show how completely he exhausted every available means of obtaining from defendant facts material to the account and how fruitless were all his efforts to obtain them from said president, and also to show his evident 'unwillingness to account' and such 'evidently willful withholding by the defendant of statements duly called for' as to demand from the complainant less direct and positive evidence as to matters within the exclusive knowledge of the defendant than would otherwise be requisite to establish his claim.

"Twelfth exception. The complainant excepts to so much of the master's report as deducts from the sum of $12,912.24, which the master admits to have been savings made by the defendant by the shipments of coal in its infringing double boats to two consignees in Baltimore during the years 1874 to 1882, both inclusive, of the sum of $8,315.88, the alleged cost of applying complainant's invention to 69 pairs of boats engaged in the traffic involved in said saving, as set forth in the following paragraph, to wit:

"'The master finds proved savings to the amount of $12,278.07 by the shipment of coal in defendant's infringing double boats instead of single boats to one consignee in Baltimore during the years from 1874 to 1882, both inclusive, and savings to the amount of $634.17

by shipments to another consignee during the years from 1874 to 1881, both inclusive, making a total ascertained saving of $12,912.24.

"'The number of infringing boats engaged in the traffic involving this saving appears to have been 69 pairs, and deducting $8,315.88, the cost of applying the couplings to these boats, leaves a net saving of $4,596.46.'

"Complainant insists that, inasmuch as the evidence shows that the same 69 pairs of infringing boats which were employed in carrying coal to said two consignees in Baltimore were also employed to a much larger extent in carrying coal elsewhere for defendant, it is an error to charge the complainant with the cost of applying complainant's invention to every boat engaged in carrying coal to said two consignees.

"Finally, the complainant excepts to the whole of said report, except that part commencing with the second paragraph on page 9 and ending with the last paragraph on page 10 of said report, on the ground that it contains diverse erroneous constructions of the evidence and the law, as well as arguments not warranted by the evidence or the law.

"J. J. COOMBS,
"JOHN G. JOHNSON,
"*Counsel for Complainant.*

"(Endorsed:) No. 66. Oct. sess., 1873. Circuit court U. S., eastern dist. of Pa. John McCreary *vs.* The Pennsylvania Canal Co. In equity. Complainant's exceptions to master's report. Filed Jan. 12, 1885. W. von A. Williamson, *pro* clerk."

"United States Circuit Court, Eastern District of Pennsylvania. In equity.

"JOHN MCCREARY *vs.* "THE PENNSYLVANIA CANAL CO. } No. 66. Oct. Sess., 1873. Before the Master.

"*Exceptions taken by Defendant to the Second Draft Report of the Master.*

I.

"To so much of said second draft report as finds that

'it appears from complainant's proofs that in 1874 defendant had in use fifty-eight pairs of coupled boats containing complainant's said improvement; that in 1881 this number of infringing boats was one hundred pairs and in 1882 one hundred and twelve pairs; that these boats have been used principally, if not solely, for carrying coal over defendant's canal and the waters communicating therewith; that defendant has owned and used concurrently with its coupled boats and in the same business a number (gradually decreasing, it seems, since 1874) of single boats'—

"Defendant excepts and respectfully submits that said finding is contrary to complainant's proofs, which (while insufficient and indefinite as to the number of boats, double or single, in use on defendant's canal since 1874) show affirmatively that 'the defendant leases its boats to boatmen who do the carrying on their own account;' that the defendant 'leases its boats at so much per ton for all classes, sizes, and character of boats,' and 'the rate is the same for all classes and sizes;' that 'the defendant is not a common carrier; has nothing to do with the freight;' 'that it does not use the boats belonging to it at all,' but leases them to boatmen, and that 'the lessees make the bargains with the shippers for the freight;' that 'the contracts for freight are made by the agents of the sales agents, who take up the boats and agree for the freight,' and that 'the defendant does not run any boats itself and never did, except repair flats dredgers, &c.'

"Wherefore defendant submits that it is error for the master to find upon the proofs, as he does find in effect, that defendant has used its boats in the business of carrying coal, or that defendant has been engaged in the coal-carrying business, or has been a freight carrier, and the master should amend and correct said finding accordingly."

II.

"To the following finding of said second draft report, to wit:

"'Under these circumstances the difference between double and single boat freight rates, as representing the extent to which the canal transportation was cheapened

to defendant's direct advantage by the adoption and use of the infringing boats, might, it would seem, well be taken as the measure of the profits, savings, or advantages accruing to defendant itself from that use'—

"Defendant excepts and respectfully submits that this finding is erroneous and not supported by the premises from which it is deduced—

"First. Because the proofs show that the defendant had nothing to do with the freight, and as to its tolls and rentals the rate was the same for all classes and sizes and character of boats; that the defendant does not gain or lose a cent by either one over the other kind of boat, and that it never gained or saved a dollar by the use of double boats.

"Second. Because the 'measure of the profits, savings, or advantages' which the master establishes in said finding is based upon speculative and consequential estimates, which would apply equally to any other double boats as well as to the infringing boats in question in this case, and such measure could therefore be applied as frequently as any other improvements in double boats were under consideration; and, third, because the master has undertaken to charge the defendant with a difference in freight between two classes of boats when it is proved that so far as defendant was concerned, directly or indirectly, there was no difference in its receipts from the boats of one class over the receipts from those of the other class, its only receipts being a uniform rate of tonnage, and that tonnage being entirely distinct from the freight, the boatmen or lessee paying the tonnage rental to the defendant, and the shipper or consignee paying the freight to the boatman or lessee.

"Wherefore defendant submits that the master should amend his said second draft report by making it conform to the facts of this case and by omitting the inferential and consequential premises upon which he bases said finding."

III.

"To the following finding of said second draft report, to wit:

"'The master therefore finds an ascertained saving,

accruing to defendant, of $4,596.61, from the carrying of coal in its infringing coupled boats instead of its single boats'—

"Defendant excepts because it is clearly proved that defendant carried no coal in any of its boats; it is clearly proved that the defendant had nothing to do with the saving in freight upon which the master computes this finding, and it is clearly error for the master to charge the defendant with said balance or with any part of the total saving (fixed in a previous finding at $12,912.24) realized by the defendant's lessees in carrying coal to Baltimore, which is not on the line of defendant's canal; wherefore, and for other obvious reasons, defendant submits the master should amend his second draft report accordingly."

IV.

"To the finding of said second draft report which adopts complainant's assumption that the 'Experiment' and the 'Sixteenth Amendment' were not adopted for defendant's use with any advantage over single boats, because their construction was such that a rudder could not be applied to the forward boat, defendant excepts because no towing was required on defendant's canal, and defendant therefore would not have to separate the boats, and because, so far as carrying capacity is concerned and economy in freight is involved, the complainant himself proves the 'Sixteenth Amendment' was a success on the canal, whatever might be its defects at sea, and the master should qualify said finding accordingly."

V.

"And to the following finding of said second draft report, to wit:

"'The same defect which unfitted' 'the Experiment' and 'the Sixteenth Amendment' for 'defendant's use would attach to coupled boats such as these described in the English patent of Bartholomew and Bourne, referred to by the defendant as showing other prior systems of coupled boats which it might have freely used'—

"Defendant excepts because 'the Experiment' and 'the Sixteenth Amendment' were not unfitted for defend-

ant's use upon its own canals, and because Bourne's English patent describes the use of coupled boats with convex ends, which would admit of the application of a rudder, so as to steer either boat when separated from the other; wherefore defendant submits the master should modify said findings accordingly.

"The defendant further submits that the master should discard from his said report the following finding, to wit:

"'The master finds proved savings to the amount of $12,278.07 by the shipment of coal in defendant's infringing double boats instead of single boats to one consignee in Baltimore during the years from 1874 to 1882, both inclusive, and savings to the amount of $634.17 by shipments to another consignee during the years from 1874 to 1881, both inclusive, making a total ascertained saving of $12,912.24'—

"Because said finding is based upon incompetent testimony and because it is clearly erroneous, in that it charges to defendant freight earned by third parties; the defendant, not a carrier and not running boats to Baltimore, is charged with freight earned by boatmen entirely independent of the defendant's control and in a business entirely foreign to defendant's province. It is plainly not a sound proposition that if A rents or leases his boat to B at a fixed royalty per ton of freight transported over A's canal, and B carries the boat into other waters and there earns an increased freight without paying A any additional royalty or tonnage, A may be held to have realized more than B paid him for the rent of the boat.

"Wherefore and for other reasons the defendant submits that the master should amend his second draft report accordingly.

"Respectfully,

"HENRY BALDWIN, JR.,
Counsel for Def'd't."

"Philadelphia, Nov. 8th, 1884.

"(Endorsed:) Circuit court of the United States, eastern D. of Pa. No. 66. October sess., 1873. John McCreary *vs.* Penna. Canal Co. In equity. Defendant's exceptions to master's report. Filed Jan. 12, 1885. W. von A. Williamson, *pro* clerk."

BRIEF OF THE ARGUMENT.

The difficulties which the complainant has had to meet and overcome in obtaining evidence of the extent to which his invention has been used by the defendant, and of the profits derived from such use, have been of the most serious and embarrassing nature. All attempts to obtain any material evidence from the president of the canal company have proved utterly abortive—whether owing to his ignorance, and the strangely unbusiness-like manner in which the records and accounts of said company have (according to his testimony) been kept, or to his willful suppression and misrepresentation of the facts, is immaterial to the present inquiry, though it would not be difficult to show which is the true cause.

During nearly all the time since the defendant commenced using our invention, this suit has been pending, and the officers of said company have had notice of their liability to be called upon for an account of the extent to which said company has applied and used the invention, and of the profits derived from such use. Hence there is no excuse for the ignorance which its president professes on these points, nor for the failure of said company to keep a record of the facts necessary to be inquired into in order to ascertain the amount of profits made.

It is true that the record shows that said company had no actual knowledge of the pendency of this suit until the spring of 1875, owing to the neglect of its counsel, who had entered his appearance for the company, to notify his principal of that fact. This will account for the marked difference between the official report of President Wistar, on behalf of the directors of said company, for the year 1874, and his subsequent reports, which will be noticed hereafter.

The first question to which we invite attention is

has the patented invention of the complainant been applied by the defendant?

By the testimony of Andrew E. Fairman (p. 222, *et seq.*) and of Randolph F. Lewis (p. 231), it is proven that in October, 1881, the defendant had in use on the canal 99 pairs of coupled boats, all (except one pair having the McCreary rigging) coupled and rigged alike, and in the manner decided by the court to be an infringement of complainant's patent.

These witnesses present (pp. 270–272) a list of 99 pairs of coupled boats of the defendant, made from actual view, in said month of October, 1881. (Said list foots up 100 pairs, but Nos. 68 and 69 appear twice in the list, making the actual number in the list 99 pairs.) And deducting the pair having the McCreary rigging, leaves 98 pairs of coupled boats, all coupled and rigged alike, and in the manner decided by the court to be an infringement of our patent, which the defendant had in use in October, 1881, as proved by said witnesses.

It is also proven by Mr. McCreary (complainant) that there have been put in use on the canal during the season of 1882, 12 additional pairs of boats coupled in the same manner (p. 272).

It also appears from the schedules of manifests presented by Edward Stabler, Jr., that cargoes of coal were received by him in 1877, 1879, 1880, and 1881, in four double boats (or boats having the coupling rigging of defendant), which boats are not found in the Fairman list, viz.: Nos. 205, 201, and 92, 93. This makes two additional pairs. One of these pairs—92 and 93—has since been seen by McCreary. (See his testimony, p. 272.)

So the defendant has put in use on the canal at least 112 pairs of coupled boats, exclusive of some that have been sunk or otherwise destroyed.

Exactly how long all these boats have been in service it is impossible for us to show by positive testimony.

In the official report of President Wistar for 1874, it is stated that "the transportation which was performed by the company in its own boats upon the enlarged portion of the canal" during that year was "equivalent to 33,404,249 tons moved one mile," and that "this was done in 58 double and 51 single boats."

President Wistar now pretends to believe that what in 1874 he designated as 58 double boats, meant "58 single boats which at some time or another during the season were coupled together in pairs," and that the 58 double boats and 51 single boats mentioned in his report included but 109 boats, regarded as single boats (Ans. 17, 18, p. 192.)

To say nothing of the absurdity of supposing that President Wistar would designate "58 single boats which were sometime during the season coupled together in pairs," as "58 *double boats*," we have in this same report the most conclusive proof that such was not his meaning, for on page 13 of the report we find this statement under the head of "Equipment:"

"The number of boats belonging to the company is—

"Coal boats (main line)	168
"Lumber boats (west branch)	13
"Juniata boats	4
	185"

Now, 58 *pairs* of double boats and 51 single boats would make 167 boats in all; and at the end of the year the number of coal boats on the main line belonging to the company was 168. One boat had doubtless been built after the close of the boating season of 1874.

Mr. John McCreary, in September, 1875, testifying in this case, says:

"I tried to ascertain the number (of coupled boats) during the boating season of 1874, and I could count about the number of fifty pairs, which was a hundred boats, and they were still increasing their number by building boats of this description" (Q. 24, p. 15).

Still more astounding is President Wistar's pretence that these 58 double boats were only occasionally run coupled; that they had no coupling mechanism permanently affixed; that when coupled various kinds of couplings were used, and that but a very small proportion of the tonnage reported (he does not believe more than 10 per cent.) was carried upon coupled boats while they were coupled (see his answers to Q. 6, 7, 8, p. 191; to Q. 17, 18, p. 192; to Q. 89, p. 202, and to Q. 90, p. 202).

The errors of these statements have been proven by overwhelming testimony.

As a matter of fact all the double boats put upon the canal by the defendant, up to and including 1882, at all events, are built expressly for this coupling; and this coupling could not be applied to the single boats, but only to boats specially constructed for it (McCreary, int. 5, p. 272, and cross, 14, 15, 16, p. 274).

It is manifest, also, that the double boats are not properly adapted to being run separately, as only one of the pair has a stable upon it, and only one has a cabin, while the single boats have a stable and cabin on each (McCreary, int. 5, p. 272).

The coupling rigging is permanently bolted to the double boats, and it would be more difficult to take it off than to put it on (McCreary, int. 9, p. 273).

The complainant has examined nineteen canal-boat captains who have been running the defendant's boats, many of them ever since the double boats were first put upon the canal, in 1873. By these witnesses it is proven that the coupled boats of the company are and always

have been all coupled and rigged in substantially the same way, and as shown in the photograph, Ex. W; that boats having this coupling rigging on have always run coupled, with one or two trifling exceptions hardly worthy of mention; that said coupling mechanism is permanently affixed to the boats; and that coupling by ropes has never been practiced, to any extent, and in the very few instances in which boats have been so coupled, they have been classed and rated as single boats.

We give below the substance of all the testimony showing that double boats have *ever* been run singly, as well as of boats ever having been run coupled by ropes, or in any other manner than that decided by the court to be an infringement of our patent.

Solomon R. Shipe (p.205) testifies that he has run a pair of coupled boats of his own for eight years. These boats have "something like the McCreary attachment." He says:

"One trip I separated my boats and run them singly, for the sake of getting single-boat freight. I did not continue to run them that way, because it is an unhandy way to run them. I had one boat tied behind the other with a rope; we towed one behind the other with a long rope. To run them that way *it would have taken more men, and we ought to have had more teams;* and they were not built to run that way. *I found it better to run the boats double at double-boat freight than to run them single in that way at single-boat freight.*"

Samuel Derr (p. 207). Has run double boats of the Pa. Canal Company since 1873. None of the company's double boats are rigged materially different from what is shown in the photograph, Ex. W.

The coupling and steering devices of the Pa. Canal Company's double boats are "made fast to, bolted on" the boats.

Believes that last summer (1881) Captain Mills made

several trips with one boat of his double boats, while he was getting the other one repaired, and thinks Captain Shower left one of his boats and made a trip with the other, late in the fall, six or seven years ago, being afraid he might not be able to get through with both boats. These are all the instances he knows of or can call to mind of double boats being separated and run singly.

Peter Derr (p. 209). Has been running company's boats since 1876. The coupled boats of the company were (with the exception of one pair coupled by the McCreary arrangement) coupled as shown in the photograph, Ex. W. Never saw any other kind of rigging on the Pa. Canal than the McCreary rigging and the Pa. Canal Company's rigging. Has seen two single boats connected together by ropes. Sometimes two boats are so connected for company's sake.

D. E. Shellenberger (p. 211). Has run a pair of the Pa. Canal Company's double boats; commenced using them in 1880. Ex. W. represents a pair of the Pa. Canal Company's double boats. Thinks he has seen most if not all of that company's double boats. The only difference (in respect to the coupling) is that some have the blocks set on the outer edge of the boat, and some have them set back a few inches towards the center. Never runs his boats singly. Believes he saw one run so last summer. Wm. Mills was running it. Did not run it the whole season that way. Only knows of his doing so for two or three trips. Thinks one of his boats had been sunk and he took it to the dry dock. Only knows of this one instance of double boats being run singly.

Wm. E. Portzline (p. 214). Has used boats of the Pa. Canal Company eight or nine years. Has run their double boats for nine seasons. The photograph, Ex. W., represents a pair of the Pa. Canal Company's double boats. There is one pair of the company's double boats rigged differently. It has the McCreary rigging. Has

seen all their boats. There is also one pair in which the steering rigging is on the front instead of the hind boat—just the reverse of what the photograph shows. Has known some of the company's double boats to be separated and make trips single. No. 123, one fall, left the bow boat at home and made a trip singly; 138 or 139 did so; one was left at the dry dock and the other made several trips single. Has known one of a pair of boats to be sent to Harrisburg and the other to Columbia, but that is not often the case. They came to Harrisburg together and were then separated, and in returning were coupled together at Harrisburg and went back together.

David O. Ritter (p. 216). Has boated with the Pa. Canal Company's boats nine years. Has used coupled boats ever since they have been in use by the company. Has examined Ex. W. and takes that to be the apparatus now used for connecting two boats by the Pa. Canal Company. Has seen most of the boats used by the company. So far as he has any knowledge, their coupled boats are all coupled by rigging like that shown by the photograph. It is a permanent arrangement There is no difference in the coupling arrangement since the time they first coupled, only they have been enlarging some of the blocks and changing their position. Don't know of any one running coupled boats singly. Don't know of any other mode of coupling boats than that used by the Pa. Canal Company or the rigging of McCreary.

Andrew E. Fairman (p. 222). This is the witness who made out the list, from personal view, of 99 pairs of double boats of the Pa. Canal Company (complainant's exhibit "Fairman Memorandum Book)." He states that all the boats in that list, with the exception of one pair, are rigged alike, and in the manner represented in the photograph. That one pair he thinks had the McCreary rigging, but is not certain.

Edward Stabler, Jr., a large coal dealer in Baltimore, produces the manifests of all the cargoes of coal he has received by the Pa. Canal Company's boats from 1874 to September 13, 1882, inclusive, nearly 600 in number, a large majority of them being by double boats, all coupled, so far as he has observed (and he has seen most of them), in the manner shown in the photograph, Ex. W. He has never seen but one pair of boats coupled in any other way, and that was a boat built by McCreary, the "Sixteenth Amendment."

We have thus given the substance of all the testimony tending in the remotest degree to support the statements of President Wistar as to various kinds of coupling being used by the Pa. Canal Company, and as to boats with the coupling rigging being run separately. It exhibits the testimony of President Wistar in a light very unfavorable to his character for candor, to say the least.

We have shown that in 1874 the defendant had 58 pairs of double, infringing boats in service, and during the season of 1882 has had at least 112 pairs in service, being an increase of 54 pairs since the close of the boating season of 1874.

Exactly how many of these additional boats have been built or put in service each year during said eight years (from the end of 1874 to and including 1882) it is impossible for us to show by positive testimony. Doubtless the president of said company could, if he would, furnish the information. In view of his failure to do so, when requested, it would be fair and reasonable to assume that the increase was regular, from year to year. This would make the equivalent of 27 pairs in service during the whole of said eight years. From the meager information which we can glean from the annual reports of the president of said company which have been produced and put in evidence, it is manifest that this would not be an unfair assumption.

It appears from the annual report of 1874 that the company had in service during the boating season of that year 58 pairs of double coal boats and 51 single coal boats (167 boats regarded singly) on the main line of the canal. It also appears from the same report that on the 31st of December of that year the company had on the main line 168 boats, which shows that one boat had been added after the close of the boating season of that year. It also appears from the reports in evidence, that the company had in service, in 1875, coal boats on the main line, 180 boats, being an increase after the close of the boating season of 1874, of.....13 boats
Built in 1876.....18 "
Built in 1877.....14 "
Built in 1878.....9 "

54 boats

Making 54 coal boats on the main line added by the company during the four years from the close of the boating season of 1874 to the end of 1878. If all coupled, these would make 27 pairs, precisely one-half the increase of double boats put in service by the company during the eight years from the end of 1874 to and including 1882, as above shown.

If said increase of 54 pairs of boats was made regularly, in the same proportion, from year to year during said eight years, the use of them would be equivalent to the use of 27 pairs during the whole eight years.

The reports for 1881 and 1882 not having been produced, we are unable to show, from the reports, how many of said 54 pairs of double boats were put in service each year during the latter half of said period of 8 years, from 1874 to and including 1882. Nor do the reports show whether all of the 54 additional coal boats put in service during the first half of said time, were coupled boats. Yet it is by no means probable that after the great ad-

vantage of running double boats had been demonstrated, in 1874, any single coal boats for the main line were built by the company. Nevertheless, to be clearly within safe bounds, let us assume that the use of the 54 pairs of double boats put in service since 1874 was equivalent to 24 pairs only (instead of 27) during the whole 8 years.

We will then have this result: Fifty-eight (58) pairs of coupled boats in use 9 years, and the equivalent of twenty-four (24) pairs in use eight years.

AMOUNT OF COAL CARRIED.

The witnesses agree that the double boats average from eight to ten trips a season, to Havre de Grace, Baltimore, or Delaware City.

D. E. Shellenberger (p. 211) says the double boats average about nine trips per season, to Havre de Grace, and as many to Baltimore. And on cross-ex. (Q. 5, p. 25) says: "We can make more than nine trips a season, but are not allowed to do so, to Baltimore.

Wm. E. Portzline (p. 214) says: "We average about a trip a month to Havre de Grace or Baltimore and return, and the boating season is about eight months."

David O. Ritter (p. 216) says the double boats will make from 8 to 10 trips from Nanticoke to Havre de Grace in a season. If they run to Baltimore, about eight trips (Q. 12, 13).

The witnesses examined on that point agree that the double boats carry, on an average, at least 250 tons per trip.

David Shumaker, p. 208.
D. E. Shellenberger, p. 211.
Wm. E. Portzline, p. 214.
David O. Ritter, p. 216.

Mr. Stabler's schedules of manifests, from 1874 to 1881, inclusive, show that during said time he received 375 cargoes in double boats, aggregating 47,536 tons, or at

the average rate of 126.76 tons per cargo—or 253.52 tons per pairs of boats per trip. Exclusive of 1874 and 1875, when the cargoes were considerably smaller than in subsequent years, the average was 129.1 tons per cargo, or 258.2 per pair of boats. So that the boatmen's estimate of 250 tons per trip is a very decided under estimate.

The above figures produce the following result:

Fifty-eight (58) pairs of double boats, running from 1874 to 1882, inclusive—(9 years)—making eight voyages per season (the lowest estimate of any witness), and carrying 250 tons per cargo, would carry 1,044,000 tons from Nanticoke to Havre de Grace, Baltimore, or Delaware City, or the equivalent thereof; and the equivalent of 24 pairs of double boats, running 8 years, making 8 voyages each per season, and carrying 250 tons per voyage, 384,000 tons, making 1,428,000 tons carried from Nanticoke to Havre de Grace, Baltimore, and Delaware City, or the equivalent thereof, from 1874 to 1882, inclusive.

[The double boats do not all make full voyages to Havre de Grace, Baltimore, or Delaware City, as some carry their cargoes to Harrisburgh, Columbia, or other way places only. But, of course, when the voyages are shorter, they are made in less time; so the result is the same as if all their voyages were full length.]

Perhaps it may be claimed that the estimate of eight voyages per season for each pair of double boats is too large, in view of the fact that some of the boats are sometimes laid up for repairs. We believe we have above made concessions which will fully compensate for all delays of that kind; but out of abundant caution not to err in our own favor, let us assume that each pair of double boats makes but seven voyages per season. We will therefore deduct one-eighth from the above total of 1,428,000 tons, reducing the amount to $1,249,500 tons transported on double boats to Havre de Grace, Baltimore, and Delaware City, or the equivalent thereof, during the 9 years aforesaid.

Another concession. It appears from the report of 1875 that the coal transportation of that year fell short of the average from 1874 to 1878, inclusive, nearly two-fifths. Now as in 1875 the company had 64 pairs of double coal boats in service (assuming that the 12 boats added that year were all coupled), and as in the above calculation they are assumed to have made 7 voyages each, carrying 250 tons per voyage, it follows that the tonnage charged for that year amounts to 112,000 tons, carried the full voyage, to Havre de Grace, etc. Two-fifths of this amount is 44,800 tons. This sum we deduct from the last above total of 1,249,500 tons, which leaves 1,204,700 tons as the amount of coal transported from 1874 to 1882, inclusive, in double boats, to Havre de Grace, Baltimore, and Delaware City, or the equivalent thereof.

In the foregoing statement we believe we have assumed no facts in favor of the complainant not fairly deducible from the evidence; and we have intended to make every conceivable concession in favor of the defendant which could, with any show of reason, be claimed by that party.

THE PROFITS.

It only remains to show the amount of profits or of savings, resulting from the shipment of this amount of coal in boats containing our invention.

Previous to the adoption of our invention by the defendant, there were no double or coupled boats in service on the canal, except a few pairs built by McCreary and his brother, under their patents. The defendant was using single boats exclusively, and its licensees have been using them to some extent ever since, although the proportion of single to double boats has been growing less and less every year.

During all the time since double boats were introduced, there has been a material difference in the rates

of freight paid on single and double boats, the highest rates being paid to single boats. As we could get no evidence on this point from President Wistar, we were compelled to seek it outside. For a time this seemed almost a hopeless task. The numerous canal boat captains whom we examined all knew perfectly well that freights on the single boats had always been higher than on double boats, but could not state, from personal knowledge, what the difference was in any particular year. In the course of our examination of these witnesses we ascertained that with every shipment of coal duplicate manifests were made out, showing by what boat shipped, the quantity of coal in the cargo, and the rate of freight per ton; and one of these manifests was delivered to the consignee with every cargo of coal. With this information we sought for evidence among the coal dealers of Baltimore, and with the most satisfactory results.

We first called Robert A. Rouse, a coal dealer of Baltimore. He produced manifests for the years 1874, 1875, 1876, 1878, 1879, 1880, and 1881. These manifests show that in 1874 the rates of freights were, on single boats, $1.40, and on double boats, $1.15 per ton. In 1875, on single boats, $1.35; on double boats, $1.10. In 1876, on single boats, $1.30; on double boats, $1.00. In 1878, on single boats, $1.00; on double boats, 75 cents. In 1879, on single boats, 75 cents; on double boats, 56 cents. In 1880, on single boats, 85 cents; on double boats, 64 cents. And in 1881, on single boats, 93 cents; on double boats, 70 cents. He produced no manifest for 1877.

We next examined Edward Stabler, Jr., a large coal dealer of Baltimore. He was able to produce all his manifests from 1874 to 1881, inclusive, which were put in evidence, together with tabular schedules of their contents, for convenient reference.

These schedules show that in 1874, the rates of freight were, on single boats, $1.40; on double boats, $1.15—difference, 25 cents per ton.

In 1875, on single boats, $1.35; on double, $1.10; difference, 25 cents per ton.

In 1876, on single boats, $1.30; on double, $1.00; up to Sept. 7, after which the freight on single boats was $1.10, and on double, 85 cents. Difference prior to Sept. 7, 30 cents—subsequent to that date, 25 cents.

In 1877, on single boats, $1.00; on double, 75 cents—difference, 25 cents.

In 1878, on single boats, $1.00; on double, 75 cents—difference, 25 cents.

In 1879, on single boats, 75 cents; on double, 56 cents—difference, 19 cents per ton.

In 1880, previous to June, on single boats, 85 cents; on double, 58 cents—difference 27 cents. After June 1st, on single, 85 cents; on double, 64 cents—difference 21 cents.

In 1881, on single boats, 93 cents; on double, 70—difference 23 cents, up to October 12, after which the rates were, on single boats, $1.02; on double, 77 cents—difference 25 cents.

Subsequently we proved by Mr. Stabler that in the season of 1882 the rates of freight were on single boats $1.02; on double boats, 74 cents—difference 28 cents per ton (pp. 252, 253).

It will be seen that in 1876, 1880, and 1881 the difference in freight rates changed during the boating season. Putting the rate of difference in each of said years at the lowest figures, viz., at 25 cents in 1876, 21 cents in 1880, and at 23 cents in 1881, we have an average during the nine years from 1874 to 1882, inclusive, of precisely 24 cents per ton difference between freights on single and on double boats, or a saving of 24 cents on every ton of coal shipped on the defendant's infringing boats during that time, for the full voyage or the equivalent thereof.

We have shown that a fair estimate, from the evidence, of the amount of coal shipped on the defendant's double

(infringing) boats, during said nine years, would be equivalent to 1,204,700 tons shipped from Nanticoke to Havre de Grace, Baltimore, or Delaware City. A profit or saving of 24 cents per ton on this quantity of coal shipped will amount to $289,126. From this sum should be deducted the cost of applying the coupling rigging to said boats.

As we can get no testimony from President Wistar on this point, we refer to his annual report for 1875, and the testimony of the complainant before the master, Sept. 5, 1882. Mr. McCreary estimates the cost of the coupling mechanism of the defendant, at "close to one hundred dollars per pair." (Q. 11, p. 273.)

In President Wistar's report for 1875 we find, on page 11, the "aggregate cost of couplings" at the end of that year stated to be $7,834.02. As the company had at that time just 65 pairs of coupled boats, this would make the cost of couplings for each pair, $120.52. The cost of coupling 112 pairs, at this rate, would be $13,498.24, which deducted from the above-mentioned sum of $289,128, leaves $275,629.76 as the clear profit or saving made by the use of the complainant's invention during the nine years, from 1874 to 1882, inclusive.

To show that this estimate is made on a most liberal basis in favor of the defendant, we refer to President Wistar's report for 1874.

It is stated in that report that the freight transported "by the company in its own boats upon the enlarged part of the canal (during that year) was equivalent to 33,404,249 tons moved one mile;" and that "this was done in 58 double and 51 single boats."

The same report states that "the average freight paid boatmen on the main line, which included boat service, labor, motive power, and every expense of transportation except canal tolls, was *in double boats* .526 of one cent per ton per mile." It does not state what freight was paid in

single boats, but it does state that "the freights in single boats exceeded those in double boats exactly 25 per cent."

As it is proved that each pair of double boats carries at least twice as much coal as each single boat, a simple computation by the rule of three will show that the freight carried on 58 pairs of double boats was equivalent to 23,202,951 tons moved one mile, and that carried on 51 single boats equivalent to 10,201,297 tons moved one mile. The freight on the 23,202,951 tons moved equivalent to one mile in double boats, at .526 of one cent per ton per mile, amounts to $122,047.52. And as "the freights in single boats exceeded those in double boats exactly 25 per cent." it follows that it would have cost just $30,511.88 more to have carried this amount of coal in single boats. So it plainly appears from the report of President Wistar, for 1874, that the saving from the use of 58 pairs of double boats during said year amounted to the aforesaid sum of $30,511.88. This sum multiplied by 9 amounts to $274,606.92. In view of the fact that the number of double boats has been nearly doubled since 1874, it is manifest that a computation of profits based upon the assumption that freights in single boats cost 25 per cent. more than in double boats during the whole nine years, would make a much worse case for the defendant than we have made above.

MEASURE OF PROFITS.

The *savings* made by the use of complainant's invention are to be charged as *profits* to the value of which the complainant is entitled. (Tilghman *v.* Mitchell, 4 Fisher, 599.)

Where the invention infringed is a mere improvement on an old machine, the patentee is entitled to recover from the defendant the profits only which the latter has made from the use of the *improvement*. Hence it is often very difficult to ascertain the amount of profits which

have arisen from the use of the *improvement*, as contra-distinguished from those which have arisen from the use of the entire machine, including the improvement.

No such difficulty, however, exists in this case. Boats containing the patented improvement of the complainant have, during the whole time of their use by the defendant, been used side by side with boats not containing it, in the same trade, between the same places. The saving made by shipping coal in boats containing the invention, over the cost of shipping by boats not containing it (less the cost of applying the invention), is due to the use of the invention exclusively, and unquestionably constitutes the measure of profits to which the complainant is entitled; and we think we have shown, from the evidence, that such saving, during the nine years that the defendant has been using our invention, amounts to at least the above-mentioned sum of $276,584.

THE RESPONSIBILITY.

That a very large sum of money has been saved by the use of complainant's invention on the boats of the defendant, is undeniable. But it is now represented by President Wistar that the Pennsylvania Canal Company is not a common carrier, transports no coal, and has no interest in the rates of freight paid for the transportation of coal upon its own boats. It is claimed by him that whatever profits or savings may be made by the shipment of coal on its coupled boats, no part thereof inures to the benefit of the said canal company.

We will show from the evidence that whatever artifices may have been resorted to by said company to give these statements the semblance of truth, they are not even nominally true in respect to the year 1874, which was before the defendant became aware of the pendency of this suit.

In President Wistar's report for that year it is stated

that "the transportation which was performed *by the company in its own boats* upon the enlarged part of the canal" was "equivalent to 33,404,249 tons moved one mile."

It is stated in the same report that "the average freight paid boatmen on the main line, which included boat service, labor, motive power, and every expense of transportation, except canal tolls, was in double boats .526 of one cent per ton per mile." Again it is stated that "the freight in single boats exceeded that in double boats exactly 25 per cent.;" and that the cost of transportation "would be further reduced by the exclusive use of the double boat."

There is in evidence a printed form of the contract of lease which the company made with its boatmen up to the 11th of January, 1882, in which the lessee of the boat binds himself "to freight coal therewith *for the said* PENNSYLVANIA CANAL COMPANY, *under the direction of said company, its officers, or agents,* to any point or destination by it or them required during the continuance of this agreement, and not to freight or use said boat for any other person or persons whatsover without written consent of the said Pennsylvania Canal Company, and not to hire, or let, or in any way or under any arrangement or pretext whatever deliver or transfer the possession of said boat to any other person or persons, or use or freight the said boat or allow it to be used or freighted for the business of any other person or persons, party or parties, whatsoever, except the said PENNSYLVANIA CANAL COMPANY, or with its written consent," &c. And it is further stipulated that "for the freighting of coal as aforesaid *for the said Pennsylvania Canal Company* the said (lessee) is to receive the current rate of freight from Nanticoke to the several points designated respectively by the said company as aforesaid, but it is expressly agreed that from any freight money which may be earned by or become due to the said (lessee) the said PENNSYLVANIA CANAL COM-

PANY may *retain* the monthly rent of —— per cent. of the earnings of each and every trip made by said boat for each and every month," &c.

And this form of lease (Exhibit No. 1, Jan. 11, 1882,) President Wistar admits was used until it was called for by complainant's counsel on the last-mentioned day.

In getting up a fictitious presentation to cover a crooked transaction some step in the fiction necessary to give it the semblance of truth is very liable to be omitted. Thus in this case the canal company omitted to change the form of the contract of lease which it made with its boatmen.

In proof that the representation that the canal company derived no advantage from the lower rate of freights paid the double boats is a mere fiction, we refer to the following facts:

Prior to 1879 the company charged the lessees of the boats a rental for the use of the boats, at first of 25 per cent., on the freights earned, which was afterwards reduced to 18 per cent., and after 1878 was entirely thrown off and the rates of freight reduced correspondingly, or rather more than correspondingly.

David Shumaker, p. 208.

D. O. Ritter, p. 216.

That when the boat rents were taken off the freight rates were reduced in a little more than a corresponding ratio will be seen by reference to Mr. Stabler's schedules. These show that in 1877 and 1878 the freight rates were on double boats 75 cents, and on single boats $1.00 In 1879 the freights were reduced to 56 cents on double and 75 cents on single boats.

In 1877 and 1878 a rent was reserved of 18 per cent. on the freights earned. We have therefore this result:

For 1,000 tons shipped on double boats the freights, in 1877 or '78, would amount to $750. Deduct from this sum 18 per cent. as boat rents—$135—and we have left as the net earnings of the boats, $615.

Now, in 1879, when no boat rents were charged, and the freights on double boats were reduced to 56 cents, the net earning of the boatmen on 1,000 tons would amount to only $560, being 5½ cents per ton less than they earned in 1877 and '78, when a rental of 18 per cent. was deducted from their freight earnings.

According to the reports of President Wistar, the boat rents received by the company from 1874 to 1878, inclusive, were as follows:

1874 (p. 13)	$51,929.41
1875 (p. 11)	43,199.14
1876 (p. 13)	54,978.31
1877 (p. 11)	35,651.61
1878 (p. 11)	35,040.00
	$220,798.47
Average per year	$44,159.69

Did the canal company, after 1878, lose this annual revenue, which was more than balanced by a reduction in the freight rates, and generously permit the Susquehanna Coal Company to receive the benefit of it? According to the testimony of President Wistar this must have been the case, for the lessees of the boats made nothing by the change, but on the contrary, lost 5½ cents per ton.

But here again the company, in getting up a fictitious presentation, has failed to cover its tracks. For President Wistar's reports for 1879 and 1880, (the only reports we have since 1878) show that the company received for boat rents—

In 1879	$42,731.89
In 1880	43,237.73

Now, as the lessees of the boats have paid no boat rents since 1878, but have had their freight rates reduced in-

stead, how and from whom did the company get rents to the amount of $85,969 in the years 1879 and 1880? No explanation of this apparently crooked transaction is attempted on the part of the defendant.

It is manifest, however, that what is put down as "rents" in these two years is really the *saving* due to the difference in freights on the double and single boats.

It will be seen by Mr. Stabler's schedules that this difference in 1879 was 19 cents per ton; in 1880, 27 cents per ton up to April 29, and 21 cents after June 1. At what time between April 29 and June 1 the change was made does not appear, because Mr. Stabler has no manifests between those dates. It will be fair to assume, however, that during one-sixth of the boating season of that year the freights on double boats were 58 cents, and on single boats 85 cents—difference 27 cents per ton.

As near as we can come at it, there were 94 pairs of double boats in use in 1880.

Mr. Stabler's schedules show that the average tonnage of the double boats during that year was just about 260 tons per cargo.

Now, if these double boats made eight trips each during that year, carrying 260 tons per pair, the amount of coal carried by them would be 195,520 tons. At 21 cents per ton (the difference between double and single boat freights) this will amount to $41,059.20. But during about one-sixth of that season the difference in freights was 27 cents. Therefore, there should be added to the last-mentioned sum six cents per ton on one-sixth of the coal transported that season, as above shown, viz., 32,586 tons, amounting to $1,955.16, making the total saving for that year on coal transported on double boats, $43,014.36, being a variance of only $223.37 from the amount put down as "rents" in President Wistar's report for that year. A like calculation for 1879 will show a similar result.

In view of these facts, can there be any doubt that the

items put down as "rents" for the years 1879 and 1880 represent the saving of 19, 21, and 27 cents per ton on coal shipped on double boats during said years?

President Wistar denies that the canal company derives or ever has derived any benefit or advantage from the use of the double boats. He says:

"The canal company is perfectly indifferent whether coal is carried in single or double boats; it does not gain or lose a cent by either one or the other. There is not and never has been a dollar gained or saved by the use of double boats, unless in the saving of the contractor or lessee, namely, the boatman who uses them. The lessee pays the same boat hire for both classes of boats." (Q. 24, p. 193.)

Just as positively he denies that the Susquehanna Coal Company (of which he is vice-president) derives any benefit or advantage from shipping coal on the double boats. In answer to Q. 97, p. 203, he says:

"In relation to the alleged profits of the Susquehanna Coal Company from the use of these couplings, the said coal company does not now earn or save, and never did earn or save, one dollar, or gain any advantage whatever, from the use of these couplings, or from the use of the canal or any part of it, or any of its appurtenances whatever, whether belonging to the canal company or anybody else."

The evidence proves beyond all controversy that the boatmen (lessees) receive no part of the saving, realized by *somebody*, from shipping coal upon double instead of single boats.

And yet it is abundantly proven by testimony that is undenied and undeniable, that during the nine years in which the double boats have been in use, coal has been carried on the double boats at from 19 to 30 cents less per ton on the double than on the single boats. The evidence also indubitably proves that the saving from

this source during said nine years can not have been less than $275,000.

It is undeniable that this great saving has resulted from the use of infringing boats built and owned by the canal company and carefully kept under its control. If that company has permitted another company to enjoy the benefit of this saving, relying upon receiving compensation therefor in some indirect way, it can not escape responsibility therefor by any such artifice.

The infringer of a patent is held to be a *trustee*, in equity, and bound to account to the owner of the patent for the profits made from the use of the invention.

Now in case of a trustee of a landed estate, whose duty it was to rent the premises, and account to his *cestui que trust* for the rents and profits, when called upon to account, could he defend himself by showing that he had permitted a third person to receive and retain the rents and profits—especially if that third person happened to be a friend or relative of the trustee, or intimately connected with him in business?

We were prepared to show, had we been permitted, that the relations of the Pennsylvania Canal Company and the Susquehanna Coal Company are such that it really makes no difference which company receives the benefit resulting from the use of complainant's invention. President Wistar, under objection of his counsel, refused to answer our questions touching this subject, and the objection being sustained, our questions remained unanswered. But it appears from the single annual report of Isaac J. Wistar, as vice-president of the Susquehanna Coal Company for 1880, and the seven annual reports of the same Isaac J. Wistar, as president of the canal company, which we were able to obtain from the defendant, that six of the nine directors of said coal company elected for 1881 are identical with six of the directors of the canal company elected for the same year.

It further appears that five of the nine directors of the coal company elected for 1881 were directors of the canal company in the years 1874, 1875, 1876, 1877, 1878, 1879, and 1880. It also appears that ALFRED MORDECAI and JOHN DOUGHERTY, whose names appear in the report of the Susquehanna Coal Company for 1880, as *Secretary and Treasurer* of said company, have held the same offices in the Pennsylvania Canal Company right along from 1875 to 1880, which is as far as the records furnished us extend.

It also appears from said reports that the same Isaac J. Wistar is (or was) not only president of the Pennsylvania Canal Company and vice-president (and acting president) of the Susquehanna Coal Company, but a director in each of said companies.

We recognize the doctrine laid down by the Supreme Court in Mowry *v.* Whitney (14 Wall., 649). In that case the learned judge, delivering the opinion of the court, says:

"Now, it is clear that Whitney is not entitled to receive more than the profits *actually made* in consequence of the use of his process in the manufacture of 19,819 wheels."

We are only claiming "the profits *actually made* in consequence of the use" of our invention on infringing boats built and owned by the defendant and while under its control. If the defendant permitted another corporation to receive and retain said profits, in order to avoid responsibility to the complainant, it can make no difference.

In *Burdell* v. *Denig* (2 Otto, 819) Mr. Justice Miller, delivering the opinion of the court, says:

"In cases where profits are the proper measure it is the profits which the infringer makes, or *ought to make*, which govern, and not the profits which the plaintiff can show that *he* might have made."

Of course the learned judge did not mean to be understood as saying that the defendant can in any case be charged with profits he *might have made* by a more extensive infringement of the plaintiff's patent. His language above quoted will not bear that construction, for it can not be said that the defendant *ought* to have infringed more extensively.

But where profits have accrued from the use of infringing machines made and owned by the defendant, and while under his control, surely the defendant *ought* to have received said profits, and not to have permitted another party to receive and retain them.

But there is no evidence in this case that any other party except the defendant did receive and retain the profits arising from the use of complainant's invention on its boats.

President Wistar denies, most emphatically, that the Susquehanna Coal Company does now or ever did "earn or save one dollar, or gain any advantage whatever from the use of these couplings or from the use of these or any boats."

It is shown beyond all question that no part of the saving made by shipping coal on the double instead of the single boats enures to the benefit of the boatmen who lease the boats.

Whatever freights were paid by the consignees were always deducted from the price of the coal when they paid for the coal. So the consignees in fact paid no freights.

Rouse, Q. 17, p. 244.
Stabler, Q. 9, p. 252.

Who, then, save the Pennsylvania Canal Company, could have received the benefit of the great saving resulting from the use of the double instead of the single boats?

President Wistar, in his report for 1874 (which was made before the defendant had notice of the pendency of this suit) most distinctly admits that the canal company realized a saving of "exactly 25 per cent." from shipping coal in double instead of single boats. Note his language: "But the freight in single boats exceeded that in double boats exactly 25 per cent., *besides which a considerable profit*, including interest charged upon the capital invested in boats, *was earned on the boat rents*, which is included in the above estimated cost." It is further stated that "this cost would be further reduced by the exclusive use of the double boat."

We show by the highest possible evidence (the official report of its president) that the Pennsylvania Canal Company, during the year 1874, derived large profits from the use of its double boats containing our invention. Similar profits, with slight modifications, have continued to be made from the use of such boats ever since; and there is nothing in the evidence to prove that since 1874 these profits have been diverted to any other person or company. The wholesale denial of president Wistar that the canal company has received any benefit from the use of the coupled boats tends in no wise to prove such diversion, for his denial extends as well to 1874 as to subsequent years.

There is, in fact, precisely the same ground for charging the defendant with the *savings* resulting from the use of the double boats, *as profits*, in each and every year since 1874, that there is for charging the same as profits for said year, when President Wistar so clearly admitted in his report that *they did constitute profits* accruing to said canal company.

President Wistar claims that the aggregate business of the canal company has never yielded any profits. He perhaps compromises with his conscience by assuming that inasmuch as the company has made no profits on

its aggregate business, it is not chargeable, *as profits*, with the *savings* realized from the use of complainant's invention. It needs no argument to show the fallacy of such reasoning. Suppose the company has actually been doing a losing business. But for the savings realized from the use of our invention would it not have lost as much more as the sum of such savings amounts to?

President Wistar's pretense that the company would save money by abandoning the carrying of coal on the canal does not very well comport with the evidence as to the yearly increase of the number of coal boats upon the canal. Last year (1882) twelve pairs of new coupled boats were added—a larger increase than made in any one year since 1874. Is it not strange that the company should thus keep on increasing a hopelessly losing business? Does not this increase of its double (infringing) boats clearly indicate that, whatever losses the company may have sustained on its business, in the aggregate, such losses have not resulted from the use of this class of boats? It indicates, rather, that the company is endeavoring to make up for losses on some other branches of its business by extending the business of carrying coal upon boats containing complainant's invention.

RULES GOVERNING THE ASCERTAINMENT OF PROFITS.

We admit that where the invention infringed is a mere improvement on an old machine, the patentee is entitled to recover from the defendant the profits only which the latter has made from the use of the improvement * * * as contradistinguished from those which have arisen from the use of the entire machine, including the improvement. And we admit that it is incumbent on the complainant, in presenting his proofs before the master, to distinguish between the profits derived from the use of the improvement, and those derived from the general business of using the entire machine, including

the improvement. To this extent the burden of proof is admitted to be on the complainant. That is to say, unless he shows, affirmatively, some amount of profits (or savings) derived from the use of the machine *with* the improvement, over and above what had been, or were, or could have been, derived from the use of it *without* the improvement, he has failed to show any definite amount of profits derived from the use of his patented invention.

In a case like this there can be but one proper way of showing, definitely, the profits or savings derived from the use of the patented improvement, as contradistinguished from the general or gross profits derived from the use of the machines containing the improvement, and that is by comparing the results obtained from the use of machines containing the improvement with those obtained from the use of similar machines not containing it. In this particular case it is by comparing the cost of transporting coal in boats containing our invention with the cost of transporting the same in boats which the defendants used, or could have used, not containing it.

This we claim to have done by the evidence. Whether the evidence warrants the conclusion at which we have arrived, from computations based upon it, is a fair question for discussion and criticism. But it is not fair to argue that we have failed to distinguish between *general profits* derived from the use of boats containing our invention, and the profits or savings fairly shown by the evidence to be solely due to the use of our invention.

We accept, as substantially correct, the proposition laid down (in a brief filed by counsel in the court below) in the following words:

"Whatever difficulty may exist in these cases, it is "always incumbent on the complainant to establish to "the satisfaction of the master *some* measure of *actual* "damages, or of *actual* gains or profits, or of saving,

"which can be assigned to the improvement; and this is "usually established by showing the functions and value "of the patented improvements in connection with the "entire machine, *compared with that of the machine with-* "*out the patented improvements.*"

This is precisely what we claim to have done. We claim to have shown by positive testimony and legitimate deductions therefrom the amount of coal transported on boats of the defendant containing our invention during nine years, and the difference in freights paid for transportation on said boats in each of said years and those paid for transportation upon boats running in the same trade during the same time, not containing the invention; "*without the improvements;*" varying from 19 to 28 cents per ton, and averaging at least 24 cents per ton.

We have certainly shown, in our testimony before the court, the "functions" of our patented improvements, and their "value" is shown by the saving in freights resulting from their use. Hence we accept the proposition of defendant's counsel above quoted.

We have deducted from the amount of savings from the use of our invention, thus ascertained, the aggregate cost of applying our invention to defendant's infringing boats.

We have offered no evidence whatever of the *general profits* derived by the defendant from the business of transporting coal upon its infringing boats. On the contrary, we have expressly admitted that it is wholly immaterial to this inquiry whether it has realized any ultimate profits from the use of said boats, inasmuch as our claim is strictly based upon the *saving* resulting from the use of our patented improvements over what it would have cost to transport the same amount of coal on boats "without the patented improvements."

It is not true that we are claiming, broadly, the differ-

ence in the cost of transporting freight on *double* and on *single* boats. We strictly base our claim upon the difference in the freights actually paid for the transportation of coal in boats constructed and rigged according to our invention, and in *any other* boats in use upon the same waters, which the defendant had a right to use.

We admit that if there were known to the public any other inventions or contrivances for constructing and rigging canal boats, whether double or single, which the defendant had a right to use, and by the use of which it could have transported coal upon the canals and waters it was traversing at a less cost than by the single boats it was using before and during the time it has been using said infringing boats, then, *on proof of such fact*, and of the *amount* of saving that could have been made by using such boats, that amount should be deducted from the sum of savings realized from the use of its infringing boats, instead of the boats not containing our invention which it did use. For instance, if it were *proved* that there were in use, or known to the public, any other inventions or contrivances for constructing and rigging canal boats, which the defendant had a right to use, and by the use of which coal could have been transported, say ten cents per ton cheaper than by the use of its non-infringing boats, then ten cents per ton should be deducted from whatever sum of savings may be found to have been realized from the transportation of coal in its infringing boats, instead of its boats not containing our invention.

But there is not a particle of proof of any such state of facts. We say that there is no evidence that there was in existence any other inventions or contrivances for constructing and rigging canal boats which the defendant had a right to use, and could have used to any advantage over the single boats it actually did use, before and during the time it has been using said infringing

boats, and we do not know or believe any such inventions or contrivances did exist open to the use of the defendant.

If any such inventions or contrivances did exist, which the defendant had a right to use, that was a fact to be alleged and proved by the defendant. It was in the nature of matter in confession and avoidance. It is not enough to say that it is already in proof that other inventions have been patented for coupling canal boats, some of which the defendant had a right to use; nor is it enough to say that it is in proof that two pairs of *experimental* coupled boats were built and used for a time before the date of our patent, which, not being patented, the defendant had a right to imitate. The proof must go further, and must show that such boats could have been used to some advantage by the defendant, over the non-infringing boats it actually did use, before it can cut any figure in the case. And surely the burden of proof is upon the defendant to introduce such evidence if any such exists.

On this question of the burden of proof we refer to The City of Elizabeth *v.* Nicholson Pav't Co., 7 Otto, 126.

In this case the master reported the entire profits made by the contractors from the construction of a large amount of pavement which was held to infringe the Nicholson patent, and his report was confirmed by the Circuit Court, and by the Supreme Court on appeal. The defendants relied upon the fact that they laid the pavement under a patent subsequent to Nicholson's granted to Brocklebank and Trainer, and contended that although the invention infringed the Nicholson patent, yet the B. and T. patent contained some valuable improvements upon the Nicholson pavement, and that some portion of the profits made should be held due to said improvements; but presented no proof that any part of the profits made upon their contract were due to said Brocklebank and Trainer improvements.

Judge Bradley, in delivering the opinion of the court, said:

"The Nicholson pavement was a complete thing, consisting of a certain combination of elements. The defendants used it as such, the whole of it. If they superadded the addition made to it by Brocklebank and Trainer, they failed to show that such addition contributed to the profits realized. *The burden of proof was on them to do this.*"

Although the question here decided did not arise in precisely the same way as the question we are now considering, it is undeniable that the analogy is perfect.

(Here we may remark, though not strictly in place, that in the case above cited there were six English patents and one French patent for wood pavements, all prior to Nicholson's invention, in evidence, any one of which inventions the defendants had the right to use, yet the court sustained the report of the master that the complainants were entitled to the entire profits made by the defendants under their contract.)

In the absence of any evidence to the contrary, it is reasonable to assume that the non-infringing boats which the defendant was using before adopting our invention, and continued to use concurrently with its infringing boats, were the best and most economical class of boats open to its use, especially in view of the great efforts testified to by President Wistar, to cheapen the transportation of coal upon the canal in every possible way. At all events the burden of proof did not rest upon the complainant to prove the *negative* of that proposition.

BOATS WHICH DEFENDANT'S COUNSEL SAID IT HAD A RIGHT TO USE.

The first boat or system of boats referred to under this head by counsel in the court below is the system shown and described in Bourne's English patent of 1857 (printed

record, p. 158). This patent describes a system or train of connected boats intended and adapted for river navigation only, and not at all adapted for canal navigation. Besides, though the patent was granted twenty-six years ago, there is not a particle of evidence that a train or pair of boats was ever constructed or navigated under it. Upon what ground therefore could the master hold that this system could have been used by the defendant to any advantage over its single boats, or even been used at all on its canals? It evidently could not have been so used at all, as an examination of the patent will show.

One element of complainant's combination is the steering-chain, windlass, and sheaves, by which one boat is steered from the other. In so far as this part of the combination is concerned, we admit that said English patent shows substantially the same steering mechanism. But we have never claimed that there was anything new in this part of complainant's combination, considered by itself, and independently of the other elements with which it is combined, and with which it cöoperates. It is the same steering mechanism which we proved in our opening testimony was upon the McCreary coupled boats "Experiment," built in 1860, substantially the same shown in the Frick patent of 1868, and the same that was upon the McCreary boats "Sixteenth Amendment," built in 1870.

Another essential element in complainant's combination is an overhanging guard or bumper on the stern of the forward boat, with which the stern only of the rear boat comes in contact, securing at all times an open space between the hulls of the two boats, so that they can not come in contact when the two contiguous ends rise on the swell of a wave, as affording room for carrying a rudder on the stern of the forward boat. This testimony shows that both of these effects are highly important in

coupled boats for canal navigation. The construction shown and described in Bourne's English patent not only fails to produce either of these effects, but utterly precludes the production of either. The contiguous ends of the boats having verticle, parallel walls, from deck to bottom, as near together as practicable, without coming in actual contact, and the boats being connected by rigid iron bars above their decks, it is manifest that said contiguous ends could not rise on the swell of a wave without bringing the lower parts of the hulls in contact, and breaking said connecting bars, or their attachments. It is equally manifest that a rudder could not be carried in position for use when the boats are uncoupled at the concave stern of the forward boat. And in passing single locks, where the boats have to be uncoupled and taken through the locks separately, a rudder on each boat is an almost indispensable adjunct. It is also a necessity when the boats are towed separately on the bay, as coal boats navigating the Pennsylvania canals are frequently required to be used.

Another very important element in complainant's combination is a connection between the two boats operating as an universal joint, so as to allow them to assume any necessary angle in respect to each other, laterally or vertically, and to roll or careen in opposite directions. In the navigation of canals, where there are many locks to pass, this is a feature of very great importance, on account of the peculiar kind of waves generated by filling and emptying the locks. It is evident, from an inspection of Bourne's drawings and specifications, that boats coupled in accordance therewith can have no universal joint between them. We have already shown that the two contiguous ends could not rise on a wave without breaking the rigid iron coupling-bars by which they are connected. It is equally manifest that the boats could not roll or careen in opposite directions without breaking or bend-

ing said bars, or rupturing their connecting joints. This is so manifest, from a mere inspection of the drawings and specifications, that expert testimony on the point appears to us to be wholly superfluous. (But see Watson's testimony, int. 9, p. 72, to int. 15, p. 74; and Stockbridge's testimony, int. 11, p. 88, to int. 19, p. 89.)

Still another very important element of complainant's combination is that of so coupling the boats that they will remain *centered* in turning a curve; that is to say, that a central point on the stern of the forward boat will always substantially coincide with a central point on the bow of the rear boat. This may be of little or no importance in river navigation (the only navigation for which Bourne's invention was designed), but is of very great importance in navigating narrow canals. (Vanhyning, int. 23, p. 45, and ints. 28, 29, p. 46.)

We do not claim that a device for keeping coupled boats centered in turning a curve was absolutely new when the invention in controversy was made by the complainant; but we do claim that the *device* for effecting that result, shown and described in his patent was new and original with him. The claim is limited to the device employed for that purpose, to wit, the "chain D," in combination with the other devices embraced in the claim. The "Experiment," built by the Messrs. McCreary in 1860, was provided with imperfect means for keeping the boats centered, to wit, a vertical stem post fitting into a groove or recess in a vertical stern post; but this was not the same means described and shown in the patent in controversy, nor was it employed in the same combination covered by complainant's first claim in said patent. So, also, the patent of E. and J. McCreary, No. 129,844, shows a device for keeping the boats centered, to wit, the notch in the overhang, and the cutwater filling into the same. But that is the patent upon which the invention in controversy is an improvement, and the improvement

consists in substituting the centering device described and shown in the patent in suit for that described and shown in said prior patent. It is an improvement, inasmuch as the chain "D" always keeps the boats substantially centered, whereas in navigating the Hall boats, built and rigged in conformity with said patent No. 128,844, the cutwater is liable to leave the notch in turning short curves. (Vanhyning, int. 101, page 51.)

It is so perfectly manifest that Bourne's English patent does not show or describe any element of the combination claimed in complainant's patent, except the steering mechanism proper (the windlass, steering chain, and pulleys), that it seems a work of supererogation to review and expose the fallacy of the testimony of Theodore Bergner, defendant's expert, on the subject.

This witness (int. 27, p. 132) starts off by the assertion that he finds the Bourne patent "to embrace the coupling for two boats in a manner whereby they are kept *properly centered.*" In answer to cross-interrogatory 46, page 137, he shows that he perfectly understood what the *centering* required by complainant's patent means; for he admits that he understands the word "centered" "as used in the first claim of said patent to mean that there shall be *no lateral deviation between the centers of the adjacent stern and bow of the two boats.*" Understanding, as he admits that he did, the sense in which the word "centered" is used in the complainant's patent, his allegation that he finds described in the Bourne patent means for keeping the boats "properly centered" must be ascribed to a desire to make his testimony conform to the interest of his clients rather than the honest truth.

In answer to the same interrogatory (27) he states that in Fig. 2 of sheet 2 of Bourne's drawings "are also represented two rods, both attached at one end to a common *universal joint* in the stern of the forward boat, these rods diverging and taking hold of the bow of the rear boat

at two points, the position of the two rods being such as to form nearly a right angle." Now, there is not one word in the specification indicating that said rods are attached to the stern of the forward boat by a "universal joint." On the contrary, the language of the specification precludes the idea that said bars are connected to either the forward or rear boat by universal joints. The specification says: "The attachments of the draw-bars A and BB consist of strong pins or spindles, projecting above the deck of the steamer at A and the deck of the barge at BB." This language clearly describes simple pivot joints.

If we refer to the drawings we find nothing in them indicating that said bars are attached by universal joints. Watson and Stockbridge, both of whom have had much more experience in examining and construing patent drawings than defendant's expert, so testify. (Watson, interrogatories 13, 14, pp. 73, 74; Stockbridge, interrogatories 16, 17, 18, p. 89.)

In answer to interrogatory 15, p. 103, Watson shows clearly that even if said bars were connected to the boats by ball and socket joints, it would be impossible for them to operate as universal joints in all directions.

Bergner construes the words in Bourne's first claim, "the articulation being in the nature of a ball and socket joint," as having reference to the joints by which the coupling bars are attached to the boats. Whether this manifestly erroneous interpretation of the language of said claim is the result of bias in favor of his employers or is attributable to his imperfect knowledge of the English language (he being a German) is immaterial, since it is manifestly a false interpretation. The language cited evidently refers to the joints formed between the boats by the fitting of the convex end of one into the concave end of the other. This does make an articulation *in the nature of* a ball and socket joint, so far as lateral deflection merely

is concerned; but it does not operate as a ball and socket joint to allow vertical deflection. And if we construe the language above recited to refer to the joints by which the coupling bars are connected with the boats, it is equally true, as has already been shown, that such joints would not permit of vertical deflection. (Watson, int. 9, p. 72; Stockbridge, int. 16, p. 89.)

This witness caps the climax of audacity in answer to int. 28, p. 133. In speaking of Bourne's specification, and in reference to the coupling bars A B, he says: "Those rods *are described* as keeping the constituent barges of the train at the right distance apart, and preventing them from touching one another, or from too great a space between them, the barges being thus articulated to one another by circular joints, so as to admit of vertical and lateral deflection, *the contiguous ends of the two boats remaining properly centered in all states of deflection.*" Here the witness professes to state how the coupling connection is *described* in Bourne's specification. He follows the words of the specification substantially down to the clause in relation to keeping the boats properly centered, which clause he boldly interpolates, no such language being found in any part of the specification.

On cross-examination he was compelled to admit, after one ineffectual attempt to get a pertinent answer on the point, that he does not find in the specification *one word* in reference to keeping the boats centered. But he makes a miserably lame attempt to justify his use of the language above quoted by referring to another part of the specification, where the construction described not only does not tend to show that the boats remain centered in turning a curve, but clearly shows that they could not possibly remain centered.

The witness, in this attempt to misrepresent the "*description*" given in Bourne's specification of his coupling mechanism, must have presumed a great deal upon the

carelessness or obtuseness of counsel if he hoped to escape detection.

In answer to cross-ints. 60, 61, p. 140, this witness admits that Fig. 2 of sheet 2 of Bourne's drawings show the adjacent ends of both boats vertical from top to bottom, and so near together that the boats could only be slightly deflected vertically by rising on a wave without breaking the coupling bars. It is equally manifest that even if the boats were coupled further apart the adjacent ends could not rise on a wave to any considerable extent without breaking, or at least bending, said coupling bars.

It is deemed unnecessary to pursue the testimony of this witness further, inasmuch as on every point in which he has attempted to demonstrate that Bourne's patent describes or shows any element of complainant's combination, except the steering mechanism proper, he is palpably contradicted by the specification and drawing themselves, as well as the clear and consistent testimony of two eminently qualified experts—Watson and Stockbridge.

It is a fact worthy of consideration that Stockbridge, who for many years had charge of the Patent Office as first assistant and principal examiner of the class to which these inventions belong, and who is now a member of the Board of Examiners-in-Chief, allowed the patent on which this suit is brought, with a full knowledge of Bourne's English patent. (Ints. 6, 7, 8, p. 87.) He was not a hired expert, but appeared to testify, in obedience to a subpœna, without knowing in what case or in relation to what subject-matter he was to be examined.

2. The next boat (or pair of boats) referred to by counsel was the coupled boats "Experiment," built and put in use on the Pennsylvania Canal by complainant and his brother in 1860. This pair of boats, *under the inducement of being allowed to run at half tolls*, was in use on the Pennsylvania Canal two seasons, but was then abandoned as a double boat, the boats separated, and ever after run

singly. Truly, this was literally an "abandoned Experiment." The fair presumption is that the boats would never have been run coupled at all but for the inducement of half tolls; for on the expiration of the time during which they were allowed to run at half tolls they were separated and never run coupled thereafter.

3. Next in point of time, counsel refer to a train of coupled boats shown and described in an English patent of one Bartholomew of 1862. As in case of the Bourne patent, there is no evidence that a train of boats, or a pair of boats, was ever constructed or coupled in pursuance of this patent, though it is now 21 years old. Where is there any evidence that this invention could have been adopted by the defendant and used to transport coal cheaper than on its single boats? Is the master to assume that it could have been in the absence of evidence?

4. THE FRICK PATENT AND BOATS. It is in evidence that on the 29th of September, 1868, letters-patent were granted to Charles Frick, assignee of William Frick, for an invention in coupling canal boats. Three pairs of boats were built under said patent, and were run two or three seasons.

John Vanhyning, who owned one pair (the Tide-water), and ran it two seasons, had it altered according to the McCreary invention in 1872. Andrew Fairman, who owned another pair, did the same with his. The other pair had disappeared from the Pennsylvania canals, and we have no account of it since. Undoubtedly, it was either sunk or otherwise destroyed, or the boats were separated and converted into single boats.

During the eleven years that have since elapsed, nobody has ever built or used a pair of boats constructed according to the Frick patent.

John Vanhyning gives his reasons for having the Tide-water altered to the McCreary plan. (Q. 21 to 29, pp. 45, 46.)

McCreary, when he altered the Frick boats and put on

his own invention, removed 3,600 pounds of expensive and worse than useless weight. (Q. 3 to 7, pp. 63, 64.)

These Frick boats were patented, and the defendant had no right to use the invention without the license of the patentee. Defendant has presented no evidence to show on what terms it could have obtained such license, or whether it could have obtained it at all.

But what is conclusive against any claim for a reduction of profits on the ground of this patent or these boats is, the defendants have offered no evidence to show that coal could have been transported on such boats any cheaper than, or even as cheap as, upon its own single boats. The fair presumption is, from the fact of their abandonment so long ago, that the invention could not be used to any advantage over the non-infringing boats of the defendant. If it could be, the burden of proof was on the defendant to show it.

5. THE "SIXTEENTH AMENDMENT." This was an experimental double boat built by complainant and his brother in 1870. Not being patented, we admit that the defendant could have used this kind of double boat with impunity, if it had been adapted to its use. But in fact it was not adapted to use on the canals navigated by the boats of Pennsylvania Canal Company, and hence it was impracticable for the defendant to have used it advantageously. On the canals which the defendant's boats navigate the double boats have to be separated to pass many of the locks, and have to be separated and towed by steamer on the bay from Havre de Grace to Baltimore. When separated a rudder to each boat is an absolute necessity. Owing to the construction of the "Sixteenth Amendment," a rudder could not be applied to the forward boat. Hence it was wholly impracticable to use this boat on the canals navigated by the defendant, and the McCreary Brothers had to sell it to the Reading Railroad Co. whose locks, we suppose, are all double. (McCreary, x-q. 34 to 36, p 17.)

No other pair of boats has been built on this plan during the thirteen years which have elapsed since the "Sixteenth Amendment" made its appearance, though all the world has had the right to construct and use such. In respect to use upon the Pennsylvania Canal and its connections, it is a clear case of an "abandoned experiment."

Besides, there is not a shadow of evidence that the defendant could have transported coal on such boats any cheaper, or even as cheap, as upon its single boats. On the contrary, the evidence shows that the defendant could not have used such boats at all upon its canals.

After the Reading Railroad Co. purchased the "Sixteenth Amendment," it was found to be unfit for use by said company on account of not admitting a rudder on the forward boat, and on account of the adjacent ends coming in contact vertically from top to bottom; and had the boats altered in accordance with the McCreary patent, No. 125,684, of April 16, 1872, and had rudders applied to both boats.

6. THE MCCREARY PATENT OF APRIL 16, 1872. We admit that this patent describes a plan of coupling and steering canal boats very little inferior to that described in the patent sued upon, and that, if defendant had pirated that invention instead of this, the same result in profits or savings would have been realized. But unfortunately for the defendant, it had no more right to use the one invention than the other. The complainant became sole owner of both patents, by assignment of his brother Elijah's interest to him, before the re-issue sued upon was granted wholly immaterial; the defendant having no more right to use an invention of which the complainant was a joint owner, without his consent, than one of which he was sole owner.

It will be seen by complainant's court record that before the defendant commenced building its infringing boats, its president had agreed in writing to adopt the

double boat of the McCreary brothers, and pay them a stated royalty for the privilege of using it; and had the option to use either or both of the inventions described in patents of April and July, 1872 (No. 125,684 and 129,844); but afterwards refused to comply with said contract, and commenced building and using the infringing boats complained of. (John McCreary, q. 29, 30, p. 16; x-q. 78 to 81, p. 22; re-direct 93, p. 24, and Exhibits J, J, J, Nos. 13, 14 and 15, p. 106.)

Under these circumstances, is it not a little "cheeky" for defendant to claim that it could have made a similar saving by the use of the invention patented April 16, 1872?

DEFENDANT'S AUTHORITIES.

Assuming that the defendant's counsel will cite here the same authorities upon which they relied in the court below, it will be noted that in every case cited by them, in which any question of profits or damages was involved, the point decided was simply that where the invention infringed is an improvement upon an old machine, the plaintiff can recover only the profits or damages arising from the use of the patented improvement, and is not entitled to recover the gross profits or damages resulting from the manufacture, sale or use of the entire machine, including the improvement.

Seymour *v.* McCormick, 16 How., 480:

This was a suit at law, based upon a patent for a very slight improvement on an old harvesting machine.

The court below instructed the jury that the plaintiffs were entitled to recover *all the profits* realized by the defendants from the manufacture and sale of the entire machine, including the patented improvement, and the jury rendered a verdict accordingly.

The Supreme Court reversed the judgment and or-

dered a *venire de novo*, on the ground that the plaintiffs were entitled only to the profits due to the improvement, in contradistinction to gross or general profits.

Mowry *v.* Whitney, 14 Wall., 620:

This was a suit in equity, on a patent for an improvement in a process for chilling the tread of railroad wheels. Other processes for chilling the tread of car car wheels had long been in use.

The master reported that the complainant was entitled to recover the *entire profits* realized from the manufacture and sale of 19,819 wheels in which the patented process of chilling had been used, amounting to $91,501.86, on which he allowed interest amounting to $10,980.22.

Exceptions were taken to this report, and it was set aside, and the case again referred to the master with instructions to inquire:

"*First.* Whether the wheels made and sold by the defendant had, or could have been made to have, any market value, without being subjected to the process patented by Whitney; and,

"*Second.* If they had or could have been made to have such value by any annealing or slow cooling process, outside of the Whitney patent, how much additional value, if any, they derived from being subjected to that patented process."

To this the master returned that he was unable to make any division of profits, and again reported as before the entire profits on the manufacture and sale of 19,819 wheels, with interest as before, and $19,984.21 accrued interest, making a total of $122,465.29. A decree was rendered accordingly.

This decree was reversed by the Supreme Court on the ground that Whitney was "not entitled to more than the profits actually made in consequence of the use of

his process in the manufacture of 19,918 wheels;" and the case was remanded with instructions to proceed in accordance with the rules laid down in said opinion.

Littlefield *v.* Perry, 21 Wall., 205:

This was a patent for an improvement in coal stoves. The error was in the decretal order, which directed an account of all the profits which the defendants have received from the manufacture, use, or sale "*of stoves, &c., embracing the improvements described in and covered by the said letters patent,*" &c.; and the master accordingly reported the entire profits made by the manufacture and sale of stoves containing the patented improvement, and this report was approved by the court below and a decree rendered accordingly.

The Supreme Court decided that the decree was "too broad," on the principle settled in Mowry *v.* Whitney, saying the question to be determined was, "what advantage did the defendant derive from using the plaintiff's invention over what he had in using other processes open to the public, and adequate to enable him to obtain an equally beneficial result."

Black *v.* Munson, 14 Blatch.:

The point decided is stated in the syllabus as follows:

"In ascertaining the profits derived by a defendant from the use of a patented furnace for burning tan as fuel, the plaintiff must show before the master the particular profits which accrued to the defendant from using such improvement, *and is not entitled to the entire profits arising from the use of the furnace.*"

It appears from the report that in this case the defendant introduced evidence "to rebut the claim of damages by showing that an equally good result was produced in the furnaces in which tan was burned, which did not use the patentee's improvement" (p. 267).

Shillinger *v.* Gunther, 15 Blatch.:

"The reference and master's report proceeded on the view that all the value in the infringing pavement was due to the patented improvement, and the master reported, as profits, the profits made by the defendant in laying the entire pavement" (syllabus).

Here again the error originated in the order of reference.

Garretson *v.* Clark, 15 Blatch.:

The patent infringed was for a trifling improvement in mops.

"The master reported, that as no evidence had been given before him of damages resulting to the plaintiff or profits accruing to the defendant from making and selling the patented improvements, as distinguished from the whole mop, he found for the plaintiff nominal damages only" (syllabus).

Calkins *v.* Bertrand, 10 Bissell (8 Fed. Rep., 755):

The patent was for a slight improvement in cultivators. The master first reported the profits made by defendant on 4,020 cultivators made during 5 years—$30,023.75—although it was shown that defendant's machine contained only one element or feature of complainant's patented invention, and other features peculiar to defendant's machine were covered by patents held by defendants.

The court referred this report back to the master with directions to "further inquire and report more fully what profits have been made by the defendant's upon the the machines manufactured by them" * * "and also what portion of profits reported by him as made by the defendants on their said machine is or may be due to the patented devices and improvements of the said defendants contained in said machines, and the value of the said defendants' improvements found in their said machine

which ought to be deducted from the gross amount of profits found by said master.

On this reference the master made a second report, finding the net profit made by defendants on machines manufactured by them to be $23,470.08, after deducting for rent, taxes, bad debts, clerk hire, &c., $17,838.42. From the net profits so found, he deducted one-half "as the proportionate amount due to the patented devices and improvements of the defendants contained in said machines, leaving $11,735.54 as the amount of profits to which the complainants were entitled.

This he did without any evidence as to the relative value of the devices covered by the patent of the complainant and those of the defendants, stating that "the proof furnished no reliable data on which to fix the amount of profits made by defendants from the use of complainants' devices in their cultivators," &c.

(It appears from the report of this case that the defendants presented proof before the master that the device in defendants' machine covered by complainants' patent added nothing to its usefulness, value, or salability. This evidence was obtained by a trial in the field between a machine containing complainants' device and one not containing it, which showed that said device was utterly valueless in the machine.)

The report was of course disapproved.

Kirby *v.* Armstrong, 10 Bissell:

This suit was for an improvement in a bung-cutting machine. The master allowed the *entire profits* made by the defendant from the manufacture and sale of 1,387 barrels of bungs and taps, in the manufacture of which complainant's patented improvement had been used, amounting to $182, in the absence of any evidence to show what proportion, or whether any of said profits were due to the use of said improvement.

The court decided that the master should have awarded nominal damages only.

It can scarcely be necessary to point out the obvious difference between all these cases and the case now before the master.

In every one of these cases the *entire profits* made by the defendants from the use of a machine or a process including the plaintiff's patented improvement were awarded as profits or damages, while in this case we have presented no evidence as to *general profits*, but have strictly limited our claim to the difference in the cost of transporting coal upon defendant's boats containing our invention, and its own boats employed in the same trade, during the same time, not containing it.

We expected the defence to make some attempt to prove that there were some other inventions or contrivances open to the public use which the defendant might have used to some advantage over the non-infringing boats it actually did use, and thereby endeavor to reduce its liability. But we did not anticipate that it would be claimed that the master should assume, without a shadow of evidence, that there were such other known contrivances open to defendant's use by the use of which it could have transported coal any cheaper than in its non-infringing boats. The presumption is strongly against the existence of such a state of fact, and if the defendant or its counsel had any knowledge of its existence the burden of proof was upon them to show it.

THE ACCOUNT.

We admit that profits, damages, or savings must be *proved*, not guessed at or estimated *without proof*. But the proposition that the master can base no finding upon estimates which are legitimately and clearly deducible from facts established by proof is simply absurd. Whatever deductions or inferences a jury might properly

draw from facts proven, the master may draw from them. The idea that the defendant may utterly refuse or fail to furnish any facts upon which to base an account, and then require the complainant to prove facts which are or ought to be in the defendant's possession, by proof vastly more strict than would be required before a jury, is too preposterous to require refutation.

The courts recognize the doctrine that where defendants required to account before a master withhold "statements which it would seem they ought to be able to make," and manifest "evident unwillingness to account," less strictness of proof will be required of the complainant than under ordinary circumstances.

In Littlefield *v.* Perry, 21 Wall. (above cited), the patent infringed was for certain improvements in coal stoves. The order of reference directed an account of "*all* the profits, gains, and advantages" which the defendants had received, &c., "from the manufacture, use, or sale of stoves * * * embracing the improvements in and covered by the said letters patent," &c. Under this order no testimony was taken by the master as to the profits which were due to the patented improvements merely, and he reported *entire profits* derived from the manufacture and sale of stoves containing the improvements, and a decree was rendered accordingly.

The Supreme Court reversed this decree on the ground that the order of reference, and the report made by the master in pursuance of it, were "too broad." But the chief justice, in delivering the opinion of the court, said:

"The conduct of the defendants in withholding statements which it would seem they ought to be able to make, and their evident unwillingness to account, *would induce us to sustain the report had the order of reference been less broad.*" (P. 229.)

It would be impossible to conceive of a more flagrant

case of defendants "withholding statements which it would seem they ought to be able to make," or of their manifesting "evident unwillingness to account," than is exhibited by the conduct of the defendant in this case.

PROFITS PROVED BY POSITIVE TESTIMONY, EXCLUSIVE OF ANY ESTIMATES.

Now let us see what profits or savings have been proven by *positive testimony*, independently of any estimates whatever.

I. It is most distinctly admitted by President Wistar, in his official report for 1874, that during said year the freight transported "by the company, in its own boats upon the enlarged part of the canal, was equivalent to 33,404,249 tons moved one mile;" that "this was done in 58 double and 51 single boats;" and that "the average freight paid boatmen on the main line, which included boat service, labor, motive power, and every expense of transportation except canal tolls, was in double boats .526 of one cent per ton per mile;" and that "freights in single boats exceeded those in double boats exactly 25 per cent."

It is abundantly proven that each pair of double boats carries twice as much coal as each single boat.

We have shown that from these admitted and proven facts it follows, with *mathematical certainty*, that the freight carried in 58 pairs of double boats during that year was equivalent to 23,202,921 tons moved one mile, and that carried in 51 single boats was equivalent to 10,201,297 tons moved one mile; and that the freight on 23,202,951 tons moved equivalent to one mile in double boats, at .526 of one cent per ton per mile, amounts to $122,947.52. And as "the freights in single boats exceeded those in double boats exactly 25 per cent." it follows that it would have cost just $30,511.88 more to have carried this amount of freight in single boats. This shows a

saving of the last-mentioned sum made in that single year by the use of 58 pairs of double, infringing boats.

Not a solitary "estimate" enters into this computation. It is all based upon facts either admitted by President Wistar, or abundantly proven by the testimony, and the amount is ascertained by a simple computation by the rule of three, which any school-boy can verify.

In so far as the savings of said year (1874) are concerned, there can be no shadow of ground to question that said savings inured to the benefit of the defendant, in view of the admissions of President Wistar in his report for that year, and the form of lease prepared or adopted by the company during that or the next preceding year—both of which (the report and form of lease) were made before the defendant had knowledge of the pendency of this suit.

Futhermore. It is shown by positive testimony, independently of any "estimates" or "presumptions," that on the coal received by Mr. Stabler from 1875 to 1882, inclusive, a saving in freight was made by shipments on defendant's infringing boats, of $10,910.59, as follows:

It was shown by the tabular statements of defendant's brief, that Mr. Stabler received by infringing boats of the defendant, in the years 1875 to 1882, inclusive, an aggregate of 46,279 tons of coal:

It appears from the manifests that in the years 1875, '76, '77, and '78, the difference in freights on double and single boats was uniformly 25 cents per ton. It appears from defendant's tables that during said four years Mr. Stabler received by infringing boats of the defendant 21,300 tons, the saving on which, at 25 cents per ton, amounts to.....	$5,325.00
In 1879 he received 7,924 tons, and the difference in freights during that year was 19 cents per ton, making a saving of.....	1,505.56
Carried forward.....	6,830.56

Brought forward...	$6,830.56
In 1880 he received 6,112 tons, and the difference in freights was 21 cents per ton, saving.....	1,283.52
In 1881 he received 5,351 tons, and the difference in freight was 23 cents, saving.....	1,230.73
In 1882 he received 5,592 tons and the difference in freight was 28 cents, saving.....	1,565.76
Total saving.....	$10,910.57
This sum added to the saving in 1874, as above shown.....	30,511.88
Makes a total saving of.	$41,422.45

On the total shipments by infringing boats in 1874, and the shipments to a single dealer in Baltimore during the eight next succeeding years, all proved by positive testimony and admissions of President Wistar. In addition to this, a considerable saving is proven by the manifests introduced by Mr. Rouse; but not having said manifests, nor any statement of their contents before us (as we have of the Stabler manifests) we can not here show what that saving amounts to.

Of course we do not limit our claim to the sum last above shown. We make this presentation merely to show how very "wild" is the statement of counsel that we have established no profits or savings by anything but "wild estimates and bad guessing."

We believe that the evidence proves savings by the defendant from the use of our invention fully equal to the amount set forth; and that in arriving at that sum we have made no "estimates" or "assumptions" not clearly justified by the positive proofs and by reasonable and well-settled rules for construing evidence.

Nevertheless, if the court can find any reasonable grounds for reducing the amount, we shall cheerfully acquiesce, even though the reduction may be much

greater than we could discover any reasonable grounds for conceding.

QUESTIONS RAISED BY THE MASTER'S REPORT.

Two principal questions are raised by the master's report and the complainant's exceptions thereto, to wit:

1st. Is the complainant limited in his right of recovery, by anything described, shown, or claimed in the patent of E. & J. McCreary, No. 125,684, which is now, and has been, ever since a time anterior to the infringements complained of, the sole property of the complainant?

This question is directly or indirectly raised by the first, second, sixth, seventh, and eighth exceptions.

In the master's "Draft Report" this question is very distinctly presented, and is just as distinctly answered in the affirmative. In his official report, however, it is more obscurely presented and answered. Yet the same false doctrine is asserted and invoked to defeat complainant's recovery of even the small profits which the defendant is, in that report, admitted to have made from the use of its infringing boats instead of single or non-infringing boats. For while the master admits that *some* profits have been made by the defendant from the use of its infringing boats as aforesaid, he also admits that none of the prior systems of coupled boats referred to in the proofs or cited by defendant's counsel (except that described in complainant's patent No. 125,684), "were adapted for defendant's use, *with any advantage over single boats.*" (See report, page 187.)

These admissions of the master reduce the question to the single one stated above. The *facts* upon which this question arises are as follows:

The complainant has two patents, of nearly concurrent dates, for improvements in coupling and steering canal boats, the later being for improvements upon the invention described and claimed in the earlier.

The defendant has been extensively using, without authority, the improved invention described and claimed in the later patent for eleven years, and has made very large gains and profits (in the form of *savings*) thereby.

During all this time the defendant has been using, in the same trade, and upon the same waters, a number of single boats (not containing the patented invention) at an average expense of 24 cents per ton more than it costs to ship the same freight on its infringing boats.

Complainant claims that whatever the defendant *saved* by shipping coal on its double, infringing boats, over what it would have cost to have shipped the same on its non-infringing boats, *or on any other known system of boats which it had a right to use*, is chargeable as profits, and defendant is accountable to complainant therefor.

But the master finds that the complainant is entitled to recover *no part of said profits*, because it might have made the same profits (or savings) by using the invention covered by the other patent of the complainant, which, however, it had no more right to use, without the consent of the complainant, than to use the invention of the patent in suit.

Stripped of all extraneous and irrelevant matter, this is precisely what the master's ruling on this point amounts to, because he admits that there was no other known invention or machine, save that described and claimed in complainant's said patent, No. 125,684, "*adapted for defendant's use with any advantage over single boats.*"

Whether there were other inventions or known machines, which, by *inventing and adding something thereto*, could have been "*adapted for defendant's use*," with more or less "advantage over its single boats," is surely not a question involved in this investigation. It being admitted that none of the prior inventions or machines cited by defendant's counsel were "adapted for defend-

ant's use, with any advantage over single boats," it is going outside of the case to inquire *why* they were not so adapted, or *how much* or *how little* invention would have been required to adapt them for defendant's use.

The master makes an elaborate argument to prove that there are several prior inventions and machines mentioned in the record, which might be so modified as to adapt them for defendant's use with more or less advantage over its single (non-infringing) boats. But the question is, not what improvements the defendant *might have invented and made* upon certain known inventions relating to coupled boats, to adapt them for its use, but what inventions, if any, were *in existence*, open to the use of the defendant, by the use of which it could have made the whole or any part of the savings it actually did make by the use of complainant's patented invention, instead of its single (non-infringing) boats. The master admits that there were none, except that described and claimed in complainant's said patent No. 125,684.

The case in which the rule applicable to the question under consideration was first definitely and permanently settled by the Supreme Court is that of Mowry *v.* Whitney. It is there laid down in these words:

"The question to be determined in this case is, what advantage did the defendant derive from using the complainant's invention, over what he had in using other processes *then open to the public*, and adequate to enable him to obtain an equally beneficial result. The fruits of that advantage are his profits. They are all the benefits he derived from the existence of the Whitney invention." Mowry *v.* Whitney, 14 Wall., 651.

The master utterly ignores the words in *italics* in the foregoing extract from the opinion of the court, and denies that the complainant is entitled to recover even the small amount of profits which he admits the defendant has made by shipping coal on its infringing boats

instead of its single or non-infringing boats. He refuses to allow the complainant even this small amount of admitted profits, on the sole ground that the defendant might have made similar profits by using the invention covered by complainant's patent No. 125,684. A careful reading of the report will show that he refuses to charge the defendant with said admitted profits, on this ground alone; for he admits that there were no other known inventions or machines save that of said patent No. 125,-684 "adapted for defendant's use, with any advantage over single boats." We have already said that if there were other known systems of coupled boats containing *part* of the complainant's patented combination, which might have been "adapted for defendant's use," by inventing and adding thereto something to obviate existing defects, complainant's right of recovery could not be affected thereby.

"In addition to the proven savings of that year, the master finds proved savings to the amount of $10,910.57, by the shipment of coal in defendant's infringing double boats, instead of single boats, to one consignee in Baltimore during the years from 1875 to 1882, both inclusive; and savings to the amount of $519.38 by shipments to another consignee during the years from 1875 to 1881, both inclusive, making a total ascertained saving of $41,941.38. If from this amount there is deducted $13,498.24, the total cost of applying complainant's invention to all defendant's infringing boats (there being no mode of ascertaining just how many or all those boats were engaged in the traffic involving this saving), and we have left a net saving of $28,443.14.

* * * * * * * *

"The master, therefore, finds an ascertained saving accruing to defendant of $28,443.14, from the carrying of coal in its infringing coupled boats instead of its single boats."

The *reason* of the general rule, that "where the inven-

tion is a mere improvement on an *old machine* (open to the use of the public) the patentee is entitled to recover from an infringer the difference only between the profits (or savings) actually made from the use of the improved machine, and what he might have made from the use of any other machine open to his use, is perfectly obvious and is recognized by all judicial decisions affirming that general proposition. It is that, if there were other machines or processes which the defendant *might have used*, and thereby have made a part or the whole of the profits or savings made from the use of the improved patented machine, then such part of the actual profits as could have been *legally* made by the use of any other known machine not containing the invention, are not in fact due to the improvement.

Although the improvement specified in the patent sued upon consisted in applying the coupling chain *D*, and dispensing with the notch in the overhanging guard, it constitutes a new and improved method of both coupling and centering the boats. This new coupling and centering device is claimed in combination with the same steering mechanism described in complainant's patent No. 125,684. So the patent upon which this suit is brought is undeniably for a *new combination*, and the steering mechanism, though described in said prior patent (in a different combination) is just as legitimate an element of the combination claimed of the later patent as of that of the earlier. In neither is it claimed as in and of itself new.

To rule that the defendant may use the combination claimed in a patent with impunity, because two of its elements are embraced (with a third device) in another patent of the complainant almost concurrent in date therewith, strikes us as an anomaly in the administration of patent law. Yet this is precisely what the master's ruling amounts to.

In Seymour *v.* McCormick (16 How.) Mr. Justice Grier, in delivering the opinion of the court, says:

"It must be apparent to the most superficial observer of the immense variety of patents issued every day, that there can not, in the nature of things, be any one rule of damages which will equally apply to all cases. The mode of ascertaining actual damages (or profits) must necessarily depend on the peculiar nature of the monopoly granted."

Now the circumstances of this case are very peculiar, and illustrate the reason of the qualifying words "*over what he had in using other processes then open to the public,*" in the quotation above made from Mowry *v.* Whitney.

The complainant, jointly with his brother Elijah, first took out a patent, No. 125,684, for a combination of devices for coupling, centering, and steering canal boats to be navigated in pairs. They obtained a patent for these devices, April 16, 1872. Although boats built in pursuance of this patent proved a great success, yet the complainant found that the mode of coupling and centering the boats was not entirely satisfactory, and devised the improvement on which the patent in suit is based, which patent was issued to John and Elijah McCreary—to the former as inventor, and the latter as assignee—July 23, 1872, 3 months and 7 days after the date of the patent on which it was an improvement.

Before the re-issue of the last mentioned patent, Elijah McCreary assigned all his right, title, and interest in both of said patents to complainant, since which time he has been sole owner of both (p. 281).

After the grant of both of said patents the defendant agreed in writing with the McCreary brothers, to use their invention or inventions (having the option to use either or both) and to pay a royalty therefor of $50 for each pair of boats to which either invention should be applied. (J. McCreary, re-direct 93–94, p. 24; and Exhibit J J. J., No. 13, p. 106.)

The defendant, in violation of its agreement, got up an infringing boat, and has been extensively using it ever since, with great advantage, and refusing to pay any royalty therefor.

It is admitted that the defendant has made large profits (in the form of savings) from the use of its infringing boats instead of its non-infringing boats used concurrently therewith; and it is also admitted that "the proofs show with sufficient conclusiveness, that such prior coupled boats as it would be open to defendant to use were not practically available to be used by it, with any beneficial results over its single boats."

It may be true that if the defendant could have used the invention as patented in complainant's patent No. 125,684 it could thereby have made substantially the same savings that it made by using the invention covered by the patent in suit. But it elected to infringe the later and better patent, for the improved invention, instead of the earlier patent. By so doing the master holds that it escaped all liability.

If the master's ruling on this point is to stand, it is very certain that in no possible way can the complainant recover a single cent of the many thousands of dollars profit which the defendant is admitted to have made from the use of his infringing boats.

If sued thereon defendant would claim that it has not infringed said patent No. 125,684, because it has not used the *centering device* described therein and composing one element of the *combination claim* thereof.

The master in his official report admits that the proofs show that the defendant has saved $4,596 by the use of its infringing boats, and that there was not any other known system of boats open to its use by which *any part* of this saving could have been made.

We have shown that if said ruling is correct there is no possible way in which the complainant could recover

one cent of the profits which the defendant is admitted to have made from the unauthorized use of his patented invention. And the same rule will apply to every case where the same patentee has two subsisting patents for inventions of about equal utility for accomplishing the same purpose, the later being for an improvement on the invention described and claimed in the earlier. In every such case any one may infringe the later patent with impunity; and though he should make millions of profits by so doing, which he could have made in no other way (*except by infringing the other patent of the complainant*) the latter could never recover from him one dollar of such profits.

It is a familiar legal maxim that a party litigant will not be permitted to take advantage of his own wrong. Yet it is proposed to give the defendant not merely the advantage of a wrong actually perpetrated, but of a wrong it *might have perpetrated.* The plea is set up on behalf of the defendant that it might have escaped liability for the wrong complained of and still have made the same profits by *committing another wrong of the same character and equal magnitude.* Nevertheless, by infringing complainant's patent No. 125,684, it would have incurred precisely the same liability as by the infringement complained of. Admirable logic, this! but it has a parallel.

It is related that once upon a time a tramp stepped into a grocery and called for a pound of tobacco, which was weighed out to him. He then concluded to exchange the tobacco for a bottle of whisky. The exchange having been made, the tramp was about leaving with the whisky when the grocer reminded him that he had not paid for it. "Didn't I give you the tobacco for the whisky?" says the tramp. "But you have not paid for the tobacco," responded the grocer. "Haven't you got the tobacco?" rejoined the tramp. "None of your tricks upon trav-

elers!" It is said that this logic was so bewildering to the grocer that he permitted the tramp to march off with the whisky without paying anything.

It would seem that this kind of logic has so bewildered the master as to induce him to let the defendant depart scot free with all his ill-gotten gains.

SECOND QUESTION.

The other main question referred to is as to the *specific certainty* required of the complainant in his proof of facts which are (or ought to be) within the knowledge of the defendant, and which its president refuses or fails to disclose when interrogated on the subject.

This question is directly or indirectly raised by the 3d, 4th, 5th, 6th, 7th, 10th, and 11th exceptions (p. 284 to 288).

The doctrine we contend for is distinctly recognized by the Supreme Court in Littlefield *v.* Perry, 21 Wall., p. 229, where the Chief-Justice says:

"The conduct of the defendants in withholding statements which it would seem they ought to be able to make and their evident unwillingness to account *would induce us to sustain the report had the order of reference been less broad.*"

The master holds that this doctrine does not apply to this case, because, "in his opinion, the record does not show such exhaustion of the means and avenues of inquiry open to him (the complainant) accompanied by such evidently willful withholding by the defendant of 'statements' duly called for, as to demand or warrant such a relaxation for complainant's benefit of the rules of proof, such a supplying of the want of proof, by voluntary conjecture as (it seems to him) would be involved in the finding which complainant asks."

Now the complainant has not asked any "supplying of the want of proof by *voluntary conjecture;*" and the latter part of the above quotation is purely gratuitous.

All we ever claimed in respect to a "relaxation" of the "rules of proof," was that—

"The courts recognize the doctrine that where defendants required to account before a master, withhold 'statements which it would seem they ought to be able to make,' and manifest 'evident unwillingness to account,' less strictness of proof will be required of the complainant than under ordinary circumstances."

Whether the master intends to deny the legal proposition here laid down, or to deny its application to the facts of the case, is not very apparent.

Now, what are the facts necessary to be proven to show how much the defendant saved by shipping coal on its infringing coupled boats instead of its single, non-infringing boats, during the time of the infringements complained of? They are—

1st. The difference in the cost of shipping on the infringing and on the non-infringing boats during all of said time.

2d. The amount of coal shipped on defendant's infringing boats during said time.

The defendant's president utterly failed to furnish any evidence as to these facts, and questions put to him were evaded. See interrogatories 44, 45, 46, 28 to 37, 66 to 73, 81 to 84, 89 to 94.

The master admits that "it is shown that 24 cents per ton is the average of the varying differences between the different coupled and single-boat freight rates which have at different times prevailed," to Baltimore—the principal point of shipment, and the only one in respect to which it was possible for the complainant to obtain similar evidence.

The rates of freight, on double and single boats, are fixed from time to time, and posted up in the office of the Susquehanna Coal Co., at Nanticoke, and remain unchanged until a new schedule is posted up. The boat-

men have nothing to do in fixing the freight rates. If they carry any coal at all they must carry it according to the rates thus fixed and published.

Samuel Derr, p. 207.
David Shumaker, p. 208.
Charles Shellenberger, p. 210.
D. E. Shellenberger, p. 211.

It having been proven as above, and it being admitted by the master, that the average difference in freights on double and single boats during the time of the infringements complained of, was 24 cents per ton, it only remains to be shown *how much* coal was transported on defendant's double boats during said time.

The complainant, finding it impossible to get any evidence upon this point from the defendant or its president, then tried to prove by the latter the number of coupled boats the defendant had in use each year from 1874 to 1881, inclusive, and utterly failed (questions 28 to 32, 36, 37, 66 to 73, 81 to 94.)

Now, what other "means" or "avenues of inquiry" were open to the complainant which he could have pursued with the slightest probability of obtaining any specific evidence as to "*exactly* what number of new boats was added," or "*exactly* what number altogether of the infringing boats was used in any one of the years between 1874 and 1881?"

We examined the defendant's president on this point, and were told by him that neither he nor any other officer of the company could give the information. (Q. 29, 30, p. 195.)

We proved that the defendant had 58 pairs of double (infringing) boats in service in 1874, which had increased to 112 pairs in 1882—an increase of 54 pairs.

We proved that the coupled boats carry at least 250 tons per voyage, and made eight trips to Baltimore (or

its equivalent) per season. (In our statement of claim, however, we put it down at *seven* trips per season.)

But the master objects that the proofs do not show "*exactly* what number of new boats was added, nor *exactly* what number altogether of the infringing boats was in use in any one of the years between 1874 and 1881." (P. 184.)

To demand such *exact* proof under the circumstances is most extraordinary. Manifestly no one but the defendant or its officers can furnish such proof, and we tried in vain to obtain it from that source. If the defendant has kept its books and papers in such a condition (whether from negligence or design) that no one of its officers can give any information on this point, surely it ought not to object that secondary evidence is introduced to prove what its books ought to show and what its officers ought to know, unless culpably ignorant.

Still more extraordinary is it that the master should aver that the record does not show a "withholding by defendant of statements which it would seem it ought to be able to make," and deny that it has "exhibited evident unwillingness to account."

We respectfully refer the court to the examination of General Wistar before the master, pages 190 to 204, inclusive, to show how much the master is mistaken.

Surely there is no excuse for the ignorance which President Wistar professes in respect to the number of infringing boats which the defendant had in service during each year, or the number it has put in service altogether, or for the failure of the defendant to keep a record of all facts necessary to be inquired into to ascertain the extent to which our invention has been used by the defendant, or the amount of profits (or savings) made from such use.

During nearly all the time since the defendant commenced using our invention this suit has been pending,

and the officers of said company have had notice of their liability to be called upon for an account of the extent to which said company has applied and used the invention, and of the profits derived from such use.

It is true that the record shows that said company had no actual knowledge of the pendency of this suit until the spring of 1875, owing to the neglect of its counsel, who had entered his appearance for the company, to notify his principal of that fact. This will account for the marked difference between the official report of President Wistar, on behalf of the directors of said company, for the year 1874, and his subsequent reports.

To show how utterly useless it would have been to have pursued the examination of President Wistar further than we did we here refer to his answers to questions 6, 7, 8, p. 191; Q. 17, 18, p. 192; to Q. 89, p. 202, and to Q. 90, p. 202.

It will be seen that he pretends that the boats put down in his report for 1874 as "58 double and 51 single boats" were in fact only 58 single boats, which were sometimes run coupled, and 51 boats which were never at any time run coupled, making but 109 boats, regarded as single boats; and that he does not believe "that 10 per cent. of the tonnage reported was carried in double boats while they were coupled." (Q. 17, p. 102.)

He also says that said 58 double boats were only occasionally run coupled; that they had no coupling mechanism permanently affixed, and that when run coupled various kinds of couplings were used—such as rope, &c.

To show the utter recklessness of General Wistar's testimony on these points we refer to the testimony of the canal-boat captains and others subsequently taken. As to his statement that the 58 double boats in use in 1874, as shown by his report for that year, were only "58 single boats which at some time or another during

the season were coupled together in pairs," and that "the 58 double boats and 51 single boats" mentioned in said report "included but 109 boats regarded as single boats," we refer to page 13 of the same report, where it is stated that the number of coal boats on the main line belonging to the company was 168. Now, 58 *pairs* of coupled boats and 51 single boats would make 167 boats in all, and at the end of the year the number of coal boats on the main line belonging to the company was 168. One boat had doubtless been built after the close of the boating season of 1874.

All the facts necessary to the making out of a complete account of the amount of coal carried on defendant's infringing boats each year during the time of the infringements complained of; the difference in the cost of shipping said coal on infringing or non-infringing boats during each year; the number of boats to which defendant applied complainant's invention each year, as well as the total number to which it has been applied,—are facts which are, or ought to be, within the ability of the defendant to disclose. They are facts which it is utterly impossible for the complainant to prove with *absolute exactness*, except by the defendant or its officers. They are facts which the defendant could unquestionably disclose unless it has *purposely* so conducted its business as to conceal them, or has purposely destroyed or suppressed the evidence which would disclose them.

With the exception of the number of infringing boats employed by defendant in the year 1874, the number of non-infringing boats employed by it during the same year, the quantity of coal shipped on each class of boats during that year, and the difference in the cost of shipping coal on said two classes of boats during that year, the complainant has been unable to obtain from the defendant any evidence whatever on either of said questions. Even the facts we did obtain as to the operations

of 1874 we obtained from the report of the defendant's president for that year. But the complainant owes the defendant no thanks for the disclosures made in said report, because the report was made before the defendant had any knowledge of the pendency of this suit, and when the defendant could not foresee the effect upon the case of the facts therein set forth.

In his reports subsequent to 1874 said president is very careful not to disclose any similar facts. This the master remarks upon, but not to condemn the omission. On the contrary, he cited the facts to the prejudice of the complainant and to the advantage of the defendant.

CHARLES SIDNEY WHITMAN,
Counsel for Appellant.

Supreme Court, U. S.
FILED,
OCT 20 1891
JAMES H. McKENNEY,
CLERK.

No. 54. October Term, 1891.

Supreme Court of the United States.

JOHN McCREARY, APPELLANT,

vs.

THE PENNSYLVANIA CANAL COMPANY.

BRIEF FOR APPELLEE.

S. S. HOLLINGSWORTH,
For Appellee.

SUPREME COURT OF THE UNITED STATES.

John McCreary, Appellant,

vs.

The Pennsylvania Canal Company.

No. 54.
October Term, 1891

BRIEF OF ARGUMENT FOR APPELLEE.

This suit was brought by John McCreary, the appellant, against The Pennsylvania Canal Company, and is founded upon reissued letters patent of the United States, No. 5630, granted to the said John McCreary October 28th, 1873, for improvements in coupling and steering canal-boats.

The court below, in an interlocutory decree, dated October 28th, 1880, sustained the patent as valid, held that the defendants infringed the same, and ordered an account before a Master.

The Master filed his report June 12th, 1885, in which he found that the complainant had proved that the defendants had saved the sum of $4596.61 by carrying coal in coupled boats instead of single boats, which coupled boats were coupled in accordance with the specification of the complainant's patent. No damages were proved by the complainant.

The Master further reported his opinion that the complainant's patent described only an *improvement* in devices for coupling and steering boats, and a very narrow one at that; that there were other methods of coupling and steering canal-boats open to the use of the defendants, and that, consequently, the complainant was not entitled to recover the entire savings which had accrued to the defendants by reason of the use of coupled canal-boats instead of single canal-boats. He further reported that the complainant had offered no proof as to how much of the savings made by the defendants by the use of coupled canal-boats had been due to the use of the complainant's patented device as distinguished from the other methods of coupling and steering

canal-boats which might have been used by the defendant, and, consequently, he found "no proven profits, savings, or "advantages to have been received by, or accrued to, defendant "from the manufacture, use, or sale of the complainant's "patented improvements."

Exceptions were filed to this report, and after argument the court entered a final decree, in accordance with the Master's report, "that there were no profits and no damages "due and payable to the plaintiff from the defendant arising "from the use by the defendant of the invention described "and claimed in reissued letters patent of the United States, "No. 5630, owned by the plaintiff."

From this decree the complainant has appealed to this court

The reasons urged by the appellee in support of the Master's report, and the decree entered in pursuance of it, will be discussed in the following order:—

I. The state of the art at the time of complainant's invention.

II. The scope of complainant's patent.

III. The proof of profits before the Master.

IV. The rule for estimating profits.

V. The prior McCreary patent.

VI. The invalidity of complainant's patent.

I. THE STATE OF THE ART.

In order to properly understand the scope of complainant's patent the state of the art must be briefly considered.

In regard to the date of complainant's invention, complainant testifies as follows:—

(Record, page 20. McCreary, questions 58 and 59.)

58 Q. When did you first conceive the idea involved in this invention?

A. In the spring or summer of 1869 or 1870.

59 Q. State what experiments you made of this improvement?

A. *Not any;* but having spoken to my brother if the invention first patented, April, 1872, was not a success, we

would then resort to this invention, patented July 23d, 1872. (See also page 21, questions 66, 68.)

The complainant here admits that he never attempted to reduce his invention to practice. The date of his application for a patent nowhere appears upon the record, therefore the date of the patent must be taken to be the date of the invention. This is July 23d, 1872.

Wing *vs.* Richardson, 2 Cliff., 449, 450.

The state of the art of coupling and steering canal-boats at this date appears from a number of prior patents introduced in evidence and also from the testimony of the complainant.

1. British letters patent No. 11,044 of 1846, to Taylor. (Defendant's Exhibit No. 25. Record, page 152, *et sec.*) The patentee states, *inter alia*, that his invention consists in "improvements in the construction and arrangement and modes "of connecting vessels when worked in trains, whether for "canal, river, or ocean navigation."

This part of his improvement is figured on sheets 6 and 7, bound opposite page 152 of the record. The former shows a number of boats coupled according to the patentee's invention, and the latter shows the coupling device enlarged. The improvements are described on page 156 of the record.

It should be noticed of this device:—

(*a.*) That the coupling device, in addition to connecting the boats to each other tandem, keeps them what is technically termed "centred," *i. e.*, in turning a curve they remain as closely in line as is possible, all the boats being tangent to the curve they are turning. A long rope might couple the boats, but would not centre them.

(*b.*) That, although so closely connected, the bow of one boat does not interfere with the rudder of the boat in front of it. This is by reason of the projection of the stem of the boat over the rudder. This may be termed an "overhanging "bumper."

(*c.*) That the boats are capable of vertical as well as lateral motion with reference to each other. This may be termed a universal joint connection.

To sum up, British letters patent No. 11,044, of 1846, to Taylor, *show a coupling device;* (a) *whereby the boats are centered;* (b) *an overhanging bumper to protect the rudder;* and (c) *a universal joint connection.*

These, as will be seen, are the three *desiderata* in a device for coupling canal-boats.

2. British letters patent No. 1795 of 1857, to John Bourne. (Defendant's Exhibit No. 26. Record, page 158, *et sec.*) The patent is for "an improved steam train for navi-"gating shallow rivers." Sheets 1 and 2 of the drawing (Record, opposite page 160) show the method by which the consecutive boats are connected. A clear reproduction of the material figures of the drawings is given on the opposite page.

The coupling device consists of two rods A B, of equal length, fastened to and turning upon one point A of one of the boats, and having their other ends bolted to two other separate points B B upon the other boat, thus forming a letter V. To limit the angle of the inclination of the two boats thus coupled a short chain M passes from one to the other. This keeps the boats centred within a very small limit of oscillation.

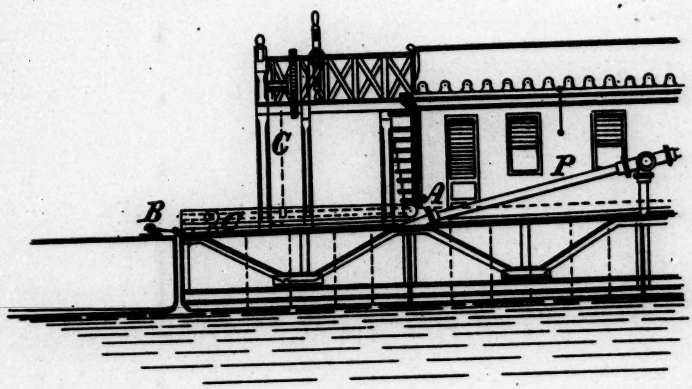
The language of the patentee's first claim must be particularly noted. He says, "I claim the combination of a steamer "and one or more barges, the articulation being of the nature "of a ball-and-socket joint, so as to permit both lateral and "vertical deflection." (Record, page 162.)

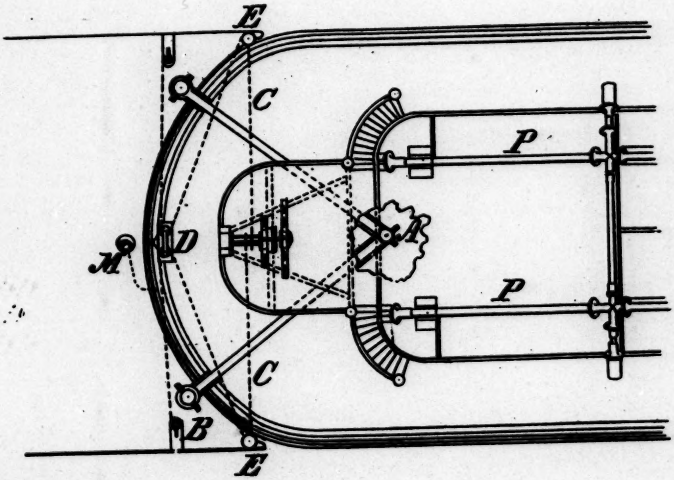
In addition to this the patent shows a steering device consisting of two chains, one on each side, and each fastened at one end to one of the boats and passing at the other ends around a windlass on the other boat, whereby the chains are reciprocally taken up and let out. The power of the steering device is increased by the multiple pulleys C D.

To sum up, British letters patent No. 1795 of 1857, to Bourne, show *a coupling device consisting of two diverging rods and a check chain, whereby the boats are substantially centred, in combination with a steering device consisting of two reciprocating side chains.*

Bourne.

A.D. 1857. June 26. N° 1795.





Bartholomew.

A.D. 1862. Feb. 7. N°330.

3. In 1860 McCreary constructed a coupled boat called the "Experiment," which was operated upon the Pennsylvania canal for two years.

A sketch of this boat constitutes complainant's Exhibit J J J No. 5 (Record, opposite page 96). The bow or nose of the rear boat fits into a corresponding notch in the stem of the forward boat.

It had a steering device consisting of two side reciprocating chains operated by a windlass upon the rear boat. These steering chains acted also as coupling chains, and the notches in the forward boat kept the boats centred.

To sum up, McCreary's "Experiment" contained *a centering device consisting of a notch on the stem of the forward vessel into which the bow of the rear vessel projects, and a coupling device consisting of two reciprocating side chains, which also served as steering devices.*

This boat, from 1860 on, was in use publicly upon the canal for more than two years (Record, page 12, questions 2 and 8–10), and having been so used more than two years before Mr. McCreary applied for any patent relating to the subject, it must be held to be public property by reason of more than two years' public use without application for a patent.

4. British letters patent No. 330 of 1862, to W. H. Bartholomew. (Defendant's Exhibit No. 27. Record, page 164.) A clear reproduction of the most material figure of the drawings is given on the opposite page. The patent is for a device for coupling a number of barges together, and is in principle singularly like McCreary's "Experiment," except that several instead of only two vessels are shown coupled.

The rear boat contains two windlasses reciprocally connected and operated by a single hand-wheel. From each of these windlasses a chain extends, one on each side, to the forward boat and is there made fast.

The chains both couple and steer the boats while the notches keep them centred.

To sum up, British letters patent No. 330 of 1862, to Bartholomew, show *a centring device consisting of a notch in the*

stem of the forward boat into which the bow of the next boat projects, and so on, and a coupling device consisting of two reciprocating side chains, which also act as a steering device.

5. United States letters patent No. 53,088, granted March 6th, 1866, to G. Stackpole. (Defendant's Exhibit No. 24. Record, page 149.) A clear reproduction of the most material figure of the drawings is given on the opposite page.

The patent relates to the propulsion of canal-boats in trains. With the peculiar method of propulsion there shown we have nothing to do. The only thing to be noted is the method adopted for coupling the boats into trains. Each boat has an overhanging stem, and the bow of the following boat is attached to this stem by a single link passing through two rings fastened to the stem and bow respectively of the two boats. Each boat has its own rudder, and the overhanging stem prevents the stem of the following boat from interfering with the operation of the rudder. Obviously free vertical and lateral motion of the boats is permitted by this coupling.

To sum up, United States letters patent No. 53,088, dated March 6th, 1866, to Stackpole, show *a coupling device consisting of a link attached to the overhanging stem of one boat and the bow of the next, allowing universal motion and free use of the rudder.*

6. United States letters patent No. 125,684, granted April 16th, 1872, to E. and J. McCreary. (Complainant's Exhibit JJJ, No. 7. Record, page 98.)

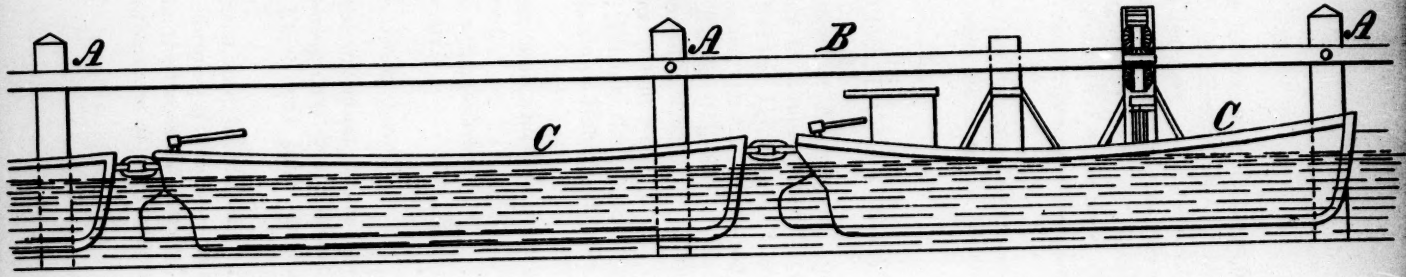
This patent shows a coupling and steering chain identical with the one used on the "Experiment," and practically identical with the steering chain shown by Bourne in 1857 (above), and Bartholomew in 1862 (above). Like the "Experiment" and Bourne's device, the centring was effected by means of a notch in the stem of the forward boat, into which the bow of the rear boat fitted. It differed from these former devices in that the stem of the forward boat was formed with an overhanging guard or bumper, thereby allowing the two boats to have vertical as well as lateral play upon each other and preventing any interference with the rudder of the former boat.

Stackpole, Spear & Cobb.

Patent No 53088.

Mar. 6. 1866.

Fig. 2.



To sum up, United States letters patent No. 125,684, dated April 16th, 1872, to E. and J. McCreary, show *a centring device consisting of a notch in the stem of the forward boat into which the bow of the rear boat projects, the said forward boat being fitted with an overhanging stem, whereby free vertical as well as lateral play is allowed and free use of the rudder, and a coupling device consisting of two reciprocating side chains, which also act as a steering device.*

It was in this state of art that the complainant applied for and obtained the patent in suit, the scope of which we must next examine.

II. THE SCOPE OF COMPLAINANT'S PATENT.

Complainant's original patent is No. 129,844, dated July 23d, 1872, for Improvements in Coupling and Steering Apparatus. (Complainant's Exhibit JJJ, No. 8. Record, page 100.) This patent was reissued October 28th, 1873, reissue No. 5630. (Complainant's Exhibit JJJ, No. 9. Record, page 102), the reissue being manifestly occasioned by the appearance in the interim of letters patent No. 134,341, dated December 24th, 1872, to I. J. Wistar, the president of the defendant company. (Complainant's Exhibit JJJ, No. 11. Record, page 104.)

The reissue is the patent upon which suit is brought, and its scope must be determined.

1. From the letters patent themselves.
2. From the state of the art.

1. The letters patent.

It is here stated that the invention relates to "improve-
"ments in devices for steering canal-boats, described in let-
"ters patent granted to Elijah and John McCreary, April
"16th, 1872, No. 125,684."

"My improvements consist, first, in coupling and centring
"said boats together and forming a universal joint between
"them by means of a chain, the two ends of which are fasten-
"ed to opposite points on the stem of the forward boat, and

"the central part of the stem or cutwater or some central "point on the bow of the rear boat, so as to hold its stem or "cutwater against the overhanging guard or bumper of said "forward boat, said chain serving to centre the boats without "the necessity of any notch in the overhanging guard for "the stem of the rear boat to fit into, and at the same time "coupling and holding the boats together and forming a uni-"versal joint between them."

The second part of the improvement is not involved.

Later on in the specification the patentee states "my im-"provements relate only to the means of coupling and cen-"tring the boats and forming a universal joint between "them, and not to the steering mechanism described in said "former patent."

The first claim (the only one involved) reads:—

"1. The combination of the two boats *A* and *B*, the steer-"ing chain *a* passing around sheaves or pulleys, and around "the windlass *C* or its equivalent, the overhanging guard or "bumper on the stem of the forward boat, and the chain *D* at-"tached to opposite points on the stem or central part of the "bow of the rear boat, so as to form a universal joint between "them, and keep them coupled and centred, substantially as "shown and described."

This claim will be seen to be for the combination of four elements:—

a. A pair of coupled boats.

b. Steering chains.

c. The overhanging guard of the forward boat.

d. The coupling and centring chain *D*.

Of the four elements the only one described in the specification as novel is the last.

2. *State of the art.*

When, however, we take into consideration the state of the art as has been previously outlined, we find that not only are all the elements of the combination old, except the last (a forked chain instead of a single one), but various combinations of them are old.

1. Taylor, 1846, shows the combination of (*a*) a pair of coupled boats, (*c*) the overhanging guard of the forward boat, and (*d*) a coupling and centring device.

2. Bourne, 1857, shows the combination of (*a*) a pair of coupled boats, (*b*) steering chains, (*d*) a coupling chain and a forked centring device.

3. The "Experiment," 1860, shows the combination of (*a*) a pair of coupled boats, (*b*) steering chains, (*d*) a centring device (notch).

4. Bartholomew, 1862, shows the combination of (*a*) a pair of coupled boats, (*b*) steering chains, (*d*) a centring device (notch).

5. Stackpole, 1866, shows a combination of (*a*) a pair of coupled boats, (*c*) the overhanging guard of the forward boat, and (*d*) a coupling chain.

6. McCreary, 1872, shows the combination of (*a*) a pair of coupled boats, (*b*) steering chains, (*c*) the overhanging guard of the forward boat, and (*d*) a centring device (notch).

It therefore appears that not only was the "centring chain "D" the only element of novelty in complainant's combination, but that all the other elements of complainant's combination had been used previously in connection with other coupling and centring devices. The bearing of this upon the question of patentable novelty will be referred to later. It is only here desired to point out that the defendant was at perfect liberty to employ all the elements of complainant's combination except the "coupling and centring chain D," and was also at liberty to employ them all in connection with any other coupling and centring device, such as that shown by (1) Taylor, (2) Bourne, or (3) Stackpole.

III. THE PROOF OF PROFITS BEFORE THE MASTER.

Notwithstanding the fact that complainant's patent covers only the use of the "coupling and centering chain D," the complainant claims to recover from the defendant the entire profit made by them by the use of *coupled boats.*

The fallacy of this method of computing the profits, even were such profits proved, will be adverted to later. It is desired to first point out that even were this method correct, and were the defendants liable to account to the complainant for the entire profits made by them from the use of coupled boats, no such profits have been proved in the case.

The burden of proof as to what profits have been made rests with the plaintiff; Tilghman *vs.* Procter, 125 U. S., 136–151; and the evidence in regard to the amount of these profits "must be reliable and tangible, and not conjectural or "speculative;" Garretson *vs.* Clark, 111 U. S., 120.

The complainant's evidence is eminently conjectural and speculative. He bases his estimates and computations upon the assumption that as freights in single boats cost twenty-five per cent. more than in double boats, therefore the complainant is entitled to an estimated and assumed theoretical and speculative saving of $269,509.76 as the fair computation, deducible from an averaged amount of freight carried on an averaged number of boats worked to an averaged extent during an averaged period of time.

The Master in his report has explained this method of computation with great care, and has shown how largely the conjectural element enters into it.

"While the proofs show that from fifty-eight pairs in 1874 "the number of infringing coupled boats built and used by "defendant had increased to one hundred pairs in 1881, and "to one hundred and twelve pairs in 1882, they do not show "exactly what number of new boats was added, nor exactly "what number altogether of the infringing boats was in use "in any one of the years between 1874 and 1881.

"It is shown that twenty-four cents per ton is the average "of the varying differences between the different coupled "boat and single boat freight rates which have at different "times prevailed to one particular point (Baltimore), but what "the differences in freight rates to points other than Baltimore "have been, or what proportion of the entire traffic has been "to Baltimore, or what total amount of coal has been carried "on the defendant's boats, coupled or single, during the period

"to be covered by the account, to all points, or to any one "point, or what amount of coal was carried in any one year "in either of the two classes of boats is not shown.

"It is shown that in a boating season defendant's boats, if "in continuous service, will make an average of from eight to "ten trips from Nanticoke, the point of landing, to Havre de "Grace, or an average of eight or nine trips to Baltimore, and "that the infringing coupled boats carry, on an average, two "hundred and fifty tons per trip.

"As to the actual number of the infringing coupled boats "which have been in continuous service during any one sea- "son, the only testimony bearing upon the point is the state- "ment of one witness that he has 'seen as many as a dozen "'pairs under repair at one time,' and that, 'as a general "'thing, there are that many laid up for repairs.'

"Upon these incomplete *data* complainant has constructed "a series of estimates exhibiting as the estimated aggregate "of the net profits of savings from the use of defendant's in- "fringing coupled boats the sum of $269,509.76.

"He first estimates that the number of infringing boats "which have been used during the period to be covered by "the account may be fairly stated as fifty-eight pairs (those "in existence in 1874), in use nine years, and in addition "the equivalent of twenty-four pairs in use eight years, this "being an estimated average, based upon the assumption that "the increase in the number of infringing boats, from year to "year, after 1874 was regular. An exact calculation upon "that basis would make the number of boats in use during "the eight years equivalent to the use of twenty-seven pairs, "during the whole eight years, but complainant reduces the "figures to twenty-four pairs in order 'to be clearly within "'safe bounds.'

"Then the computation proceeds with an estimate that "these boats have each performed annually (during a period as "to fifty-eight pairs of nine years, and as to twenty-four pairs "of eight years), an amount of service equivalent to the "transportation of eight cargoes of two hundred and fifty "tons each from Nanticoke to Havre de Grace, Baltimore, or

" Delaware City, making an aggregate tonnage of one million " four hundred and twenty-eight thousand tons.

" It is admitted that 'the double boats do not all make full "'voyages to the places named, as some carry their cargoes "'to Harrisburg, Columbia, or other way places only.' 'But "'(it is suggested), of course, when the voyages are shorter "'they are made in less time, so that the result is the same "'as if all the voyages were full length.'

" From this estimated total tonnage a deduction of one- " seventh is made (reducing the amount to one million two " hundred and twenty-four thousand tons) as a 'concession' " or allowance for the fact 'that some of the boats are some- "'times laid up for repairs.'

" Still another 'concession' or reduction of forty-four thou- " sand eight hundred tons is made for the fact that in 1875 " the coal transportation fell short of the average nearly two- " fifths.

" These deductions leave, as the estimated tonnage, the " equivalent of one million one hundred and seventy-nine " thousand two hundred tons carried to Baltimore, Havre de " Grace, or Delaware City on the infringing boats.

" Complainant then multiplies this amount of tonnage by " twenty-four cents, that being the average ascertained saving " per ton upon coal shipped in coupled boats to Baltimore. " From the amount thus obtained ($283,008) he deducts " $13,498.24, the ascertained aggregate cost of applying the " couplings to one hundred and twelve pairs of boats, leaving " $269,509.76, which amount he claims as the 'clear profit or "'saving made by the use of complainant's invention from "'1874 to 1882, inclusive.'

" The Master fails to find warrant in the proofs either for " complainant's method of estimating the amount of service " performed by the infringing boats or for his application to " all the tonnage thus estimated of the ascertained average " saving per ton upon the unascertained amount of tonnage " actually carried to Baltimore."

His conclusion is " that he is not at liberty to adopt as the " basis of any finding in this case a computation of which

"every step is a matter of more or less arbitrary—however "probably moderate—conjecture."

In addition to the Master's reasons for rejecting this estimate, the following suggestions are made:—

The complainant undertakes, first, to find out how many coupled boats were run on the defendant's canal. What he has proved is that in 1874 there were fifty-eight double boats, and in 1881 there were one hundred double boats on the canal. He then, by some rough system of averages, concludes that there has been an average of eighty-two double boats in use on the canal since 1874.

This is not *proof* of how many were in use during each of these years; it is a mere guess, and cannot be made the basis of a calculation of profits. It is then *assumed* that each double boat made eight trips each year to the bay coupled, and carried each trip two hundred and fifty tons of coal.

The evidence relied upon to establish the number of trips *actually* made is that of Shellenberger, Record, page 212; Portzline, Record, page 215; and Ritter, Record, page 217.

If the evidence of these witnesses is carefully read, it will be seen that they are speaking of the number of trips *a boat* can make ordinarily. This estimate does not take into consideration the delays made necessary for repairs and from other reasons. Portzline, however, in his testimony distinctly qualifies what he says by adding, "unless laid up for "repairs;" and then says that they are laid up six, eight, and nine weeks for repairs, and that he has seen as many as a dozen *pairs* laid up for repairs at a time, and that there are generally this number out of use for this purpose.

This evidence alone shows how unreliable such estimates as the complainant has made use of are in making a calculation of actual profits. The total number of trips must be reduced by the proportion of boats generally idle; *i. e.*, $\frac{12}{82}$, or, say $\frac{1}{7}$.

Stabler's tables (Record, pages 257–269) show no such number of trips. The greatest number in any one year was four.

The average tonnage seems to be about correct. By taking the total tonnage received by Stabler in double boats

and dividing it by the number of boats, it will be found that the average tonnage per double boat is two hundred and fifty and one-half tons.

It is assumed that boats run to the bay coupled. There is not a word of proof of this kind in the case.

The Stabler tables show that only twenty-eight per cent. of the coupled boats which went to Baltimore were there *in pairs*. It is purely a matter of presumption when they separated. It is just as likely to have been *above* as *at* the bay. The only reasonable presumption is that they separated at the place where the missing boat was needed, which may have been at the bay or at any place above there where a cargo of coal was wanted. In the absence of any proof it cannot be assumed that *all* coupled boats went to the bay.

All that can be deduced from the complainant's data is that an uncertain number of boats made an unascertained number of trips to undesignated places, carrying generally two hundred and fifty tons of coal; and it is seriously urged that this is a sufficient basis for a calculation of profits.

Having got this far in the calculation, and shown to his own satisfaction how many tons of coal had been carried in double boats, it became necessary for the complainant to show in the second place how much had been saved in carrying each ton.

Having calculated as above that there had been carrried one million four hundred and twenty-eight thousand tons of coal, the amount is reduced by the complainant to one million two hundred and four thousand seven hundred tons by way of concession, from a fear that perhaps he has not been quite fair all the way through. The calculation is then continued by multiplying this number of tons by twenty-four cents, thus reaching the amount of savings with which the defendant is to be charged after deducting from the gross result of this estimate the cost of equipping the boats with couplings, riggings, &c.

It will be observed that the complainant has found twenty-four cents as the saving per ton from the use of double boats. The process by which this result is reached is curious.

Twenty-four cents represents the average difference in freight upon double and single boats to Baltimore during the years 1874 to 1882 inclusive, as the same appears on certain manifests offered in evidence under objection.

The defendant contends:—

1. That the manifests are not evidence, being simply unsworn statements of a third party, and not even proved to have been made by such third party, but got in the ordinary course of business from a fourth party, *i. e.*, the boat-captain.*

There is no evidence outside of the manifest (Record, pages 241–243), and they were objected to (Record, page 273).

2. The average difference in freight would not afford a basis for calculating gross savings unless the tonnage was the same each year. As a matter of fact, if the difference in freight each year is multiplied into the Stabler tonnage alone for that year, and the results added for all the years, the average difference per ton is not twenty-four cents, but a small fraction over twenty-three.

It appears both from the great variation in the annual coal tonnage which passed over the canal and from the continuous but varying increase in the number of boats that the tonnage must have varied greatly in each of the years from 1874 to 1882, so that a result reached by multiplying the average difference in freight to Baltimore, even if that represented the average difference in freight to other points, must necessarily be erroneous.

3. There is no evidence that twenty-four cents was the average difference between double and single boats. Even if it fairly represented the difference in freight to Baltimore, it by no means follows that it represented the difference to other points.

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* The complainant, feeling the stress of this objection, contends that the tables are to be treated as though Stabler had sworn to their contents *after* refreshing his recollection by examining them. The answer is obvious. He has *not* so sworn. If he had, it would not make the tables themselves evidence. See notes to Price *vs.* Earl of Torrington, 1 S. L. C., 507.

The total tonnage to Baltimore consigned to Stabler was only fifty-two thousand tons, about one-twentieth of the total estimated tonnage; where the rest of it went does not appear, nor does it appear what was the difference in freight to the points to which it was consigned. It does appear (see evidence of the captains: Shumaker, Record, page 208; Derr, Record, page 209; Funk, Record, page 211; &c.) that the freight was *not* the same to all points.

For these reasons it is submitted that the complainant has utterly failed to fix the value of any saving or gain per ton in the carriage of coal in double boats, and that the Master was entirely justified in refusing to base any estimate of profits upon such purely conjectural data.

If, however, the complainant had succeeded in showing all the saving he claims, he has utterly failed to show that this saving was made by the defendant.

The complainant has ingeniously assumed, without a particle of evidence, that the saving in freight is the same as boat-rent, and that, therefore, the defendant made any saving then that was made.

General Wistar testifies (Record, pages 193 and 194, questions 24 and 25, and pages 203–205) that the rent charged the boatmen was the same for double and single boats, and there is not another word of testimony on this subject in the record.

The complainant having failed to establish anything by his supposed identity of freight and boat-rent, has fallen back upon an effort to prove the identity of the Susquehanna Coal Company and the defendant company.

The evidence shows that the defendant has never owned more than one-quarter, and now owns one-eleventh only of the stock of the coal company. (Record, page 200.)

It certainly cannot be claimed that as such stockholder it would be liable for the saving made by the coal company, if any, from the use of complainant's invention.

But it is quite clear that this saving was not made by the coal company. The freight was paid by the consignees. (Page 91.)

It is true the rate was fixed by the coal company, but it

does not appear that it made any profit corresponding to the difference in rates between the two classes of boats.

Lower rates on double boats may have helped the coal company to dispose of its coal, but the difference in dollars and cents cannot be measured by the difference in the rates. To thus measure it, is a pure assumption, unsupported by a single fact in the case.

It is finally insinuated, not plainly stated, that as the reports of the defendant for 1879 and 1880 show boat-rents as follows:—

1879	$42,731 89
1880	43,239 73

and as the saving in freight in these years amounted (as the complainant calculates it) to about these sums, that, therefore, boat-rents are thus "freight saved" under another name.

The tonnage in the boats consigned to Stabler in these years averaged two hundred and sixty per double boat. Assuming that they made eight trips each year, the tonnage for each boat each year would be twenty hundred and eighty tons. The complainant assumes that there were ninety four double boats in 1880.

If all the boats built by the company up to the end of 1878 were double boats, and none had been lost, there were at the end of 1878 eighty five double boats, and five more, which is more than was built in 1870, and we have in 1879 ninety double boats; multiplying the tonnage of one boat for 1879 by the number of boats (2080×90) and we have the total tonnage one hundred and eighty seven thousand two hundred. The saving that year was nineteen cents per ton ($187,200 \times 19$) = $35,568; whereas the amount for boat-rents was $42,731.89, thus showing how absolutely misleading are these calculations.

The Master, however, while properly rejecting this entire estimate, has made a finding that the complainant has proved savings by the defendant from the use of coupled boats to the extent of $4596.36.

This finding is made by the Master in case the court should

think that the complainant is entitled to the entire saving from the use of *double boats* over the cost of using *single* boats.

The facts upon which the Master based his finding were these: It was proved that sixty-nine double boats had, during the years from 1874 to 1882 inclusive, carried coal to Baltimore, on which the saving in *freight* over the charges on *single* boats was $12,912.24. From this amount the Master deducted the cost of equipping these boats with coupling and centring devices, $8315.88, and the remainder represents the *net* saving, viz., $4596.36.

The only evidence of the rate of freight in single and double boats was what appeared on the face of certain manifests which had been handed the witness by the boat captains, and which had been given the boat captains by the Susquehanna Coal Company, from whose mines the coal had been loaded in the boats.

The witness had no knowledge outside of the manifests, and they were made by a third party and handed the witness by a fourth party, *i. e.*, the captain of the boat. They were objected to, and it is submitted are not evidence to show what rate of freight was paid by the coal company.

Suppose, however, they do show the rate of freight established by the coal company, it certainly does not follow that the difference in freight saved by the coal company by the use of the double boats is the measure of the saving made by the defendant. The defendant was not the coal company. It never owned more than one-fourth of its stock and now owns only one-eleventh of its stock.

The defendant leased its double boats at precisely the same rate it leased its single boats.

It never carried one pound of coal itself. It allowed the lessees to boat for the coal company at the rates fixed between the lessees (*i. e.*, boat captains) and the coal company, and the canal company had nothing to do with fixing these rates.

If the coal company was enabled to save money in freight by the use of the canal company's double boats, there is no evidence that any of that saving ever came into the treasury the canal company.

It is therefore submitted that in no aspect of this case can any finding of profit or saving against the *defendant* be sustained.

IV. THE RULE FOR ESTIMATING PROFITS.

Having shown the inaccuracy of the complainant's *estimates* of profits, and their speculative character, it only remains to show that even leaving this objection out of the case the complainant has adopted an entirely erroneous *standard* upon which to base his inaccurate estimate of profits.

As has been already explained, the rule of profits for the use of an infringing device is well settled.

The complainant is entitled to recover the profits or savings which accrued to the defendant from the use of the patented device over and above what he might have made by the use of other devices for accomplishing the same purpose open to the public at the time of the complainant's invention.

Mowry *vs.* Whitney, 14 Wall., 620, 651.

"Unless a patentee can show such an absolute advantage in "the use of his patent over results which could be reached by "other processes in common and unrestricted use there has "been nothing really gained, no advance made by his inven- "tion. In such a case, though he may maintain a monopoly "over his patented machine, process, or combination, and "exact such damages as he may be able to show he has "suffered from an infringer, he cannot claim any portion of "what has been realized as profits in any sense owing or "due to him, for the reason that the infringer could just as "well have obtained such product or result without his aid, "or the benefit of his work or ideas." Strong, J., Locomotive Safety Truck Company, 2 Fed. Rep., 677, 679.

Applying this rule to the present case the fallacy of the complainant's standard of profits is evident.

The complainant is only entitled to recover from the defendant as profits or savings the amount of such profits or

think that the complainant is entitled to the entire saving from the use of *double boats* over the cost of using *single* boats.

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The only evidence of the rate of freight in single and double boats was what appeared on the face of certain manifests which had been handed the witness by the boat captains, and which had been given the boat captains by the Susquehanna Coal Company, from whose mines the coal had been loaded in the boats.

The witness had no knowledge outside of the manifests, and they were made by a third party and handed the witness by a fourth party, *i. e.*, the captain of the boat. They were objected to, and it is submitted are not evidence to show what rate of freight was paid by the coal company.

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Applying this rule to the present case the fallacy of the complainant's standard of profits is evident.

The complainant is only entitled to recover from the defendant as profits or savings the amount of such profits or

savings as accrued from the use of "the coupling and centring chain D" over and above that which the defendant might have made by the use of other coupling and centring devices which it had a right to use.

This the complainant has made no endeavor to show. He has only attempted to prove, and claims to recover the entire alleged savings made by the defendant by the use of coupled canal-boats.

We have shown that coupled canal-boats had been in use from time immemorial.

We have shown that it was entirely open to the defendant to have used all of the complainant's patented combination except the "coupling and centring chain D."

We have shown that it was entirely open to the defendant to have used all the elements of the complainant's patented combination except the "coupling and centring chain D" in combination with any of the many coupling and centring devices which had previously been used.

The finding of the Master upon these points is so specific that we cannot do better than repeat it in full. It is as follows:—

"Do the proofs show the 'chain D' of complainant's "combination to be so vital an element of the machine that "without it the machine would be worthless, or worthless for "defendant's use? To answer this question in the negative "is necessarily to reject complainant's claim of profits."

"The chain D is described in the patent as a 'coupling' "and 'centring' chain. For coupling purposes it is clearly "not necessary, that function being performed by the steering "chains. Its material function is that of keeping the two "boats 'centred,'—that is, preventing sidewise movement of "the stem of the rear boat out of line with the centre of the "stem of the forward boat. It forms, in fact, what may be "termed a close central 'hinge' between the forward and the "rear boat.

"That a device for this purpose is a useful and desirable "feature of the machine the proofs show, but not that it is so "essential a feature that to it may be attributed the whole "value of the machine.

"That a centring device is not essential to the practical "use of coupled boats and upon defendant's canal is shown by "the fact that the boats referred to in the proofs as the 'Six- "teenth Amendment' and the 'Frick boats' were practically "used there each for a number of years. The construction "and mode of operation of these boats were such that the "turning a curve necessarily took the centre of the bow of "the rear boat out of line with that of the stem of the forward "boat. There is no doubt that this was an objectionable "feature in these boats, and one calculated under particular "circumstances to lead to mischievous results, but that of it- "self it made the machines worthless, or *worthless* or without "advantage for defendant's use, does not appear. Indeed, "such a finding is forbidden as to the 'Sixteenth Amend- "ment' by the testimony in this case of complainant himself, "by whom and his brother that boat was built and put into "use on defendant's canal.

"If the lack of a centring device would necessarily be at- "tended with so much graver disadvantages in machines such "as those of complainant's patent than in machines such as "the 'Sixteenth Amendment' as to make the use of it a ne- "cessity in the former case while it is not in the latter, the "proofs do not show it.

"The broadest conclusion which the proofs on this subject "warrant is that if, in turning a curve, the stem of the rear "boat is free to depart too far from a line with the centre of "the stern of the forward boat, objectionable or even mis- "chievous results may follow.

"This fact had been recognized and a remedy provided "long before complainant's invention. The English patent of "Browne shows and describes what the patentee terms a 'check "'chain,' being a chain attached at one end to a point near "the centre of the stern of the forward and at the other end "to a point near the bow of the rear boat, and of a length "sufficient to allow of a certain amount of sidewise motion "and no more.

"This device it was open to defendants to use in combina- "tion with their boats, and the same may be said of the chain

"connection shown, but not patented, in the United States "patent of Stackpole, No. 53,088.

"Neither the Bourne nor the Stackpole device is the same "in specific arrangement, mode of operation, or effect as the "chain D of complainant's patent, and therefore the use of "them by the defendant in connection with its boats would "not infringe his claim."

"Neither device would serve to hold the cutwater of the "rear boat at all times in substantial contact with the over-"hanging bumper on the stern of the forward boat nor to "prevent side play; but plainly either device could be used "with so much of the beneficial effect of complainant's chain "*D* as would arise from preventing more than a limited "amount of side play, or from preventing the boats from nec-"essarily drifting apart in case of breakage of the steering "chains."

To this it may be added that in addition to the devices mentioned by the Master as open to the defendant to use, it is obvious that the device of Taylor (1846) was open to the defendant, and would have formed a complete and perfect coupling and centring device, greatly exceeding in accuracy complainant's device.

The two rods *A B* and *A B* shown by Bourne (1857) would have formed a most complete and efficient centring and coupling device. Finally, it is self-evident that it would be perfectly practicable to fasten the bow of the rear boat to the stem of the forward boat by a small rope, which, so far as centring is concerned, would answer every purpose.

The burden of proof is unquestionab y upon the complainant to show what proportion, if any, of the profits resulting from the use by the defendant of the coupled boats was due to the use of "the coupling and centring chain *D*."

"When a patent is for an improvement, and not for an "entirely new machine or contrivance, the patentee must "show in what particular his improvement has added to the "usefulness of the machine or contrivance. He must sepa-"rate its results distinctly from those of the other part, so "that the benefits derived from it may be distinctly seen and

"appreciated. The rule on this head is aptly stated by Mr. "Justice Blatchford, in the court below: 'The patentee,' he "says, 'must in every case give evidence tending to separate "'or apportion the defendant's profits and the patentee's "'damage between the patented feature and the unpatented "'features, and such evidence must be reliable and tangible, "'and not conjectural or speculative; or he must show, by "'equally reliable and satisfactory evidence, that the profits "'and damages are to be calculated on the whole machine, for "'the reason that the entire value of the whole machine, as a "'marketable article, is properly and legally attributed to the "'patented feature.'"

Field, J., Garretson *vs.* Clark, 111 U. S., 120-121.

In view of these undeniable and undenied facts and the findings made by the Master, the utter impropriety of the claim made by the complainant for the entire savings made by the use of coupled boats by the defendant is very plain.

V. THE RELATION OF THE PRIOR McCREARY PATENT TO THE CASE.

In referring to the devices which the defendant might have used instead of the coupling and centring chain, we have made no reference to the first McCreary patent (Complainant's Exhibit JJJ., No. 7, Record, page 98) because the rule in Mowry *vs.* Whitney as to profits does not admit of comparison with prior *patented* devices which the defendant did not, but might have used to accomplish the same result.

This rule is, however, to be taken along with the further well-established modification that where the complainant's patent is for an improvement on a device itself patented, either to himself or others, and where the defendant uses both the original patented device and the patented improvement, the complainant must show what proportion of the profits which accrued from the use of the infringing device resulted from the patented improvement as distinguished

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This rule is, however, to be taken along with the further well-established modification that where the complainant's patent is for an improvement on a device itself patented, either to himself or others, and where the defendant uses both the original patented device and the patented improvement, the complainant must show what proportion of the profits which accrued from the use of the infringing device resulted from the patented improvement as distinguished

from those which resulted from the device covered by the first patent, and this from the obvious reason that as to the latter profits the defendant is liable to account to the owner of the first patent, and under any other rule would be liable to be mulcted twice of the same profits.

Seymour *vs.* McCormick, 16 Howard, 480–490.

The patent upon which this suit is founded states that it is an improvement upon the first McCreary patent. If a broad construction is given to the first McCreary patent and it is held to cover the use of any centring device in combination with an overhanging bumper and steering chains, then this statement is strictly true and the patent in suit is for the same combination with the single difference that the claim is limited to one particular form of centring device, to wit, "the chain D."

If this construction is correct, then the defendants' device must infringe both patents, and clearly under the rule just stated it is incumbent upon the plaintiff to separate the profits resulting from the two different inventions.

The practical importance of this appears when it is stated that there is now pending a suit against the defendant upon this first McCreary patent claiming infringement of it, by reason of the use of the identical boats which were held by the court below to be an infringement of the second McCreary patent, the one upon which this suit is brought.

The defendant is therefore in somewhat the position of the "unfortunate mechanic" supposed by Judge Grier in his opinion in Seymour *vs.* McCormick, who built a steam engine containing several patented improvements and was compelled to pay over his whole profits to each of a dozen or more several inventors of some small part of the engine. "By this doctrine even the smallest part is made equal to the "whole." "It is a very grave error to instruct a jury that as "to the measure of damages the same rule is to govern, "whether the patent covers an entire machine or an improve-"ment on a machine." 16 Howard, 490.

Even should this court consider such a broad construction

of the McCreary patent unwarranted, the very fact that the complainant has made such a claim under this patent shows the propriety of placing upon the inventor of an *improvement*, who is endeavoring to call another to account for profits, the necessity of segregating distinctly those profits which flow from the use of the improvement from those which result from the other parts of the device. This the complainant has made no attempt to do in this case.

VI. THE INVALIDITY OF THE COMPLAINANT'S PATENT.

The final decree in this case (Record, pages 292 and 293) from which the complainant has appealed orders and decrees:—

"That there are no profits and no damages due and payable to the plaintiff from the defendant arising from the use "by the defendant of the invention described and claimed in "reissued letters patent of the United States, No. 5630, owned "by the plaintiff."

The decree then, as originally entered, imposed the costs of accounting upon the plaintiff, and the other costs upon the defendant.

After the bill of complaint was originally filed in this case on the fourteenth day of January, 1874, a decree had been entered taking the bill *pro confesso* for want of an appearance.

On August 7th, 1875, this decree was opened and the defendant let into a defense upon condition, *inter alia*, that the defendant should pay all costs which had accrued or which *should afterwards accrue* in the case.*

A motion was afterwards made by the complainant to amend the final decree in accordance with the condition of the decree of August 7th, 1875, imposing all costs on the defendant, and also praying for an injunction.

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* These orders have not been included by the clerk in the transcript. The order of August 7th, 1875, is however referred to in the motion to award decree filed November 30th, 1886. (Record, page 293.)

The injunction was refused, but the decree was amended as to costs, placing all the costs upon the defendant by order of December 14th, 1886.

As thus amended the final decree adjudicated:—

I. That there were no profits and no damages due and payable, &c.

II. That an injunction should be refused.

III. That the defendant should pay all the costs in accordance with the condition of the decree of August 7th, 1875, by which the decree, *pro confesso*, was opened.

Under this decree it is submitted that the question of the validity of the complainant's patent is open for decision by this court on this appeal, even though no appeal has been taken by the defendant.

The decree does not expressly adjudicate the question. If carefully examined it will be found to adjudicate only the following questions:—

1. That the plaintiff owns reissued letters patent No. 5330.

2. That the defendant has used the invention described and claimed in said letters patent.

3. That there are no profits and no damages due and payable to the plaintiff from the defendant arising from such use.

4. That no injunction should issue.

5. That the defendant pay all the costs.

The question of costs was ruled by consent of the parties as expressly appears, page 294, and the conditions on which the decree *pro confesso* was opened.

All the decree is therefore equally consistent with the invalidity as with the validity of the patent.

The finding that there are no profits, &c., would equally result from the invalidity of the patent as from no profits being proved in the case.

Consequently when this decree is before this court on appeal, it is a matter of indifference upon what ground of law the court below decided. It is only the question of whether the decree is or is not correct as it stands, and should this court hold the patent invalid the decree would be perfectly correct as it stands.

The adjudication in the interlocutory decree that the patent is valid is only an adjudication so far as it affects the accounting. The question was entirely within the power of the court below until the moment of final decree, and as a matter of fact was fully reargued upon final hearing and was left in the final decree undecided.

In the case of Troy Iron and Nail Factory *vs.* Corning, 14 Howard, 193, a suit was brought upon a patent and the Circuit Court entered a decree, finding *arguendo* that the patent was valid and the complainant's title good, but that the defendants had a valid license to use the invention and consequently dismissing the bill.

Upon an appeal by the *complainant alone* the question of the validity was fully argued in this court and was passed upon by the court. (See statement of Judge Grier, Corning *vs.* Troy Iron and Nail Factory, 15 Howard, 466.) The reasoning being that the dismissal of the bill would follow equally from the invalidity of the patent as from the proof of the license, and was consequently open for argument even though the court below had expressly decided the point against the defendant, and the defendant had not appealed from the finding.

Perhaps a more cogent reason for deciding the validity of the patent on this appeal lies in the fact that if not now open to discussion the defendant can never afterwards raise the question. It is obvious that it was impossible for the defendant to have appealed from the decree as it now stands. There is nothing in it by which it is injured. No part of it could have been assigned for correction. Every prayer of the bill of complainant has been decided adversely to the complainant. The defendant plainly could not appeal from the interlocutory decree. Neither can it appeal from a decree in its favor because the judge has given insufficient reasons for a decree in its favor and admitted by him to be correct. Corning *vs.* Troy Iron and Nail Factory, 15 How., 451–465. In this latter case it was decided that from the decree of the Circuit Court, which was before the court in Troy Iron and Nail Factory *vs.* Corning, 14 How.,

193, and which has been recited in substance above, the defendant could not take an appeal. The defendant had taken an appeal to this court on that part of the decree which was thought to establish the validity of the patent. But the court upon motion dismissed the appeal upon the ground that if the defendant was not injured by the adjudication of the decree he could not appeal from what it established *arguendo*.

The present case is even stronger, for this decree, so far from establishing the validity of the patent *arguendo*, expressly refrains from passing upon the question.

As the defendant cannot now raise the question of the validity of this patent by its own appeal, it must be open to it to raise it on the complainant's appeal, or else should this court decide against the defendant upon the question of profits and enter a decree for any of the sums found or suggested by the Master and refuse to consider now the validity of the patent, the defendant would be in the position of having an unappealable judgment against it by reason of infringment of a patent, the vital point in regard to which, namely, its validity, had never been adjudged by the court, and which no act of his could have brought before the court for review.

The subject-matter of the complainant's patent is so manifestly unpatentable under all the recent decisions of the Supreme Court that the defendant feels justified in asking the court to pass upon this question as the shortest way of disposing of the case.

The state of the art and the scope of the complainant's patent have already been examined, so that a further discussion of them is not necessary.

The substitution in complainant's patented device of the "chain D" in place of the notch in the first McCreary patent, or in place of the single chain in the Stackpole patent, or in place of the iron neck of the Taylor patent, or in place of the two iron bars in the Bourne patent, was such an obvious mechanical expedient, was so pre-eminently the simple and ordinary way of accomplishing a simple and ordinary result, that there was surely no patentable invention in making the substitution.

It would be superfluous to review all the recent cases in which this court has held precisely such trivial devices unpatentable. A few of the most recent may be referred to:—

Atlantic Works *vs.* Brady, 107 U. S., 192. (1882.)

The invention in this case consisted in attaching a screw to the forward end of a propeller dredge-boat, provided with settling tanks. It operated by stirring up the mud, which is then carried off by the current. It was shown that the use of screws for stirring up the sediment, the use of settling tanks on dredging-boats, the application of the screw at the rear end of the boat, and the use of such boat by turning it end for end, were all old.

It was held that the combination in the patent was not patentable because it would have occurred to any skilled engineer; Mr. Justice Bradley saying:—

"The design of the patent laws is to reward those who "make some substantial discovery or invention, which adds "to our knowledge and makes a step in advance in the useful "arts. Such inventors are worthy of all favor. It was never "the object of those laws to grant a monopoly for every trifling "device, every shadow of a shade of an idea, which would "naturally and spontaneously occur to any skilled mechanic "or operator in the ordinary progress of manufactures. Such "an indiscriminate creation of exclusive privileges tends "rather to obstruct than to stimulate invention. It creates a "class of speculative schemers, who make it their business to "watch the advancing wave of improvement, and gather its "foam in the form of patented monopolies, which enable them "to lay a heavy tax upon the industry of the country without "contributing anything to the real advancement of the arts. "It embarrasses the honest pursuit of business with fears and "apprehensions of concealed liens and unknown liabilities to "lawsuits and vexatious accountings for profits made in good "faith."

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A claim for attaching a detachable base-pan by means of

193, and which has been recited in substance above, the defendant could not take an appeal. The defendant had taken an appeal to this court on that part of the decree which was thought to establish the validity of the patent. But the court upon motion dismissed the appeal upon the ground that if the defendant was not injured by the adjudication of the decree he could not appeal from what it established *arguendo*.

The present case is even stronger, for this decree, so far from establishing the validity of the patent *arguendo*, expressly refrains from passing upon the question.

As the defendant cannot now raise the question of the validity of this patent by its own appeal, it must be open to it to raise it on the complainant's appeal, or else should this court decide against the defendant upon the question of profits and enter a decree for any of the sums found or suggested by the Master and refuse to consider now the validity of the patent, the defendant would be in the position of having an unappealable judgment against it by reason of infringment of a patent, the vital point in regard to which, namely, its validity, had never been adjudged by the court, and which no act of his could have brought before the court for review.

The subject-matter of the complainant's patent is so manifestly unpatentable under all the recent decisions of the Supreme Court that the defendant feels justified in asking the court to pass upon this question as the shortest way of disposing of the case.

The state of the art and the scope of the complainant's patent have already been examined, so that a further discussion of them is not necessary.

The substitution in complainant's patented device of the "chain D" in place of the notch in the first McCreary patent, or in place of the single chain in the Stackpole patent, or in place of the iron neck of the Taylor patent, or in place of the two iron bars in the Bourne patent, was such an obvious mechanical expedient, was so pre-eminently the simple and ordinary way of accomplishing a simple and ordinary result, that there was surely no patentable invention in making the substitution.

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hooks cast on the base-pan and pins on the stove body. *Held* not patentable, such a method of attachment being old in other parts of a stove.

Pennsylvania R. R. Co. *vs.* Locomotive Engine Truck Co., 110 U. S., 490. (Decided March, 1884.)

The application of a swinging-swiveling truck under the front end of a locomotive. *Held* not patentable because the use of such a truck under both ends of a car was old, although the function performed by the truck under the car was not the same as when a single truck was used under the front end of a locomotive.

Hollister *vs.* Benedict Manufacturing Co., 113 U. S., 59–72–3. (1885.)

This patent was for a stamp, having a removable metal slip, displaying a serial number or other identifying mark, corresponding with a similar mark on the stub of the stamp and so attached that the removal of such slip must mutilate or destroy the stamp.

A stamp with a stub having identifying numbers, and designed to be separated from this stamp while the stamp proper was permanently attached to the package, was old. All that was new was the removable part of the stamp proper, the contents of which identified the stamp with the stub, and which could be removed so as to retain its own integrity and at the same time destroy or cancel the stamp. Patent was held void "because it did not involve invention, but was only a display "of the expected skill of the calling."

Preston *vs.* Maynard, 116 U. S., 661.

The patent was for a wheeled hose carriage with nozzle holder, &c. It differed from prior devices in that the reel was of sufficiently large diameter to allow the water to flow through the hose while partially wound thereon.

This was held not sufficient to sustain a patent. "To sus-"tain the patent would be to deprive the public of the right "to arrange and use a well-known apparatus in the only way "in which its purpose can be beneficially accomplished."

In order to reduce the case in hand to its simplest proposition, we have only to ask whether the substitution of the two chains as a centring device, in place of the notch patented in the first McCreary patent, was an invention.

It certainly was not.

Apart from the fact that it is plainly such an equivalent as would occur to any skilled boat-builder, it was old to use *one* chain for precisely this purpose. Such a single chain is shown in boats without a steering and centring device in the Stackpole patent of 1866; and in boats equipped with a steering and coupling device in the English patent of Bourne, of June, 1857.

The substitution of one chain would therefore be the use of an *old* device in an *old* combination to produce an *old* result.

The lawfulness of such a substitution needs no citation of authority.

The use of two chains instead of one for the same purpose, even though it produce better results, is not a patentable novelty.

In Dunbar *vs.* Myers, 94 U. S., 187 to 194, the patent claimed the use of *two* deflecting plates, in combination with a circular saw, to prevent the material from coming together after it was sawed, and interfering with the free action of the saw. It was old to use one deflecting plate for this purpose, and though it was proved that there was an advantage in the substitution of two plates for one, the patent was held void for want of invention. That case is very like the present one.

It is not claimed that the two chains differ at all in their operation or purpose. They probably are more convenient.

The law on this subject is very clearly stated in the opinion of Mr. Justice Mathews, in Hollister *vs.* Benedict Manufacturing Co., 113 U. S., 59. He says, on page 72:—

"The idea of detaching that portion of the stamp, with the "double effect of destroying the stamp by mutilation and pre- "serving the evidence of the identity of the package on which "it had been first placed in use, which is all that remains to "constitute the invention, seems to us not to spring from that "intuitive faculty of the mind put forth in search for new re- "sults, or new methods, creating what had not before existed,

"or bringing to light what lay hidden from vision; but, on "the other hand, to be the suggestion of that common expe- "rience which arose spontaneously and by a necessity of "human reason, in the minds of those who had become ac- "quainted with the circumstances with which they had to "deal. Cutting out a portion of the stamp as a means of de- "facing and mutilating it, so as to prevent a second use, was "a matter of common knowledge and practice before the date "of this patent; and cutting out a particular portion, on "which the identifying marks had been previously written or "printed, was simply cutting a stub from the stamp, instead "of cutting the stamp from the stub, as before. So that, "when the frequency and magnitude of the frauds upon the "revenue, committed by the removal of tax-paid stamps from "packages, on which they had been originally placed by the "officer, to others surreptitiously substituted for them, or by "emptying the packages of their original contents, and "fraudulently refilling them with spirits on which no tax had "been paid, attracted the general attention of the revenue "department, the answer to the problem of prevention was "found by immediate inference from the existing regulations, in "the adoption of the expedient now in question. As soon as "the mischief became apparent, and the remedy was seriously "and systematically studied by those competent to deal with "the subject, the present regulation was promptly suggested "and adopted, just as a skilled mechanic witnessing the per- "formance of a machine, inadequate by reason of some defect "to accomplish the object for which it had been designed, by "the application of his common knowledge and experience "perceives the reason of the failure, and supplies what is "obviously wanting. It is but the display of the expected "skill of the calling, and involves only the exercise of the "ordinary faculties of reasoning upon the materials supplied "by a special knowledge, and the facility of manipulation "which results from its habitual and intelligent practice; and "is in no sense the creative work of the inventive faculty "which it is the purpose of the Constitution and the patent "laws to encourage and reward."

There is one other consideration to which the attention of the court is called.

Sometimes when there is a doubt about the patentability of an alleged invention, the doubt is solved in favor of the patent by showing its great utility. In the present case the complainant has been unable to show any advantage in the use of his improvement over any other method of coupling and centring boats which are built with an overhanging guard or bumper. He tells you himself that when he built boats for the Philadelphia and Reading Railroad Company, and showed them the two different devices for centring boats, they chose the *notch* device instead of the *chain*. (Record, page 65, question 18.) When he altered two of Frick's boats in 1871 he used the notch device, and the captains of the boats said "the notch was so good that they wanted noth-"ing else." (Record, page 67, question 45.) And, although, "a boat builder by occupation" (Record, page 11, question 1), he has never built a pair of boats coupled in accordance with the specification of the patent sued upon. (Record, page 21, questions 66–68.)

The record absolutely fails to disclose any advantage in using two chains to centre the boats instead of using *one* chain or instead of using the old *notch* device.

The decree should be affirmed:—

1. Because complainant's patent disclosed no patentable invention.

2. Because complainant has not shown any profits or savings accruing to the defendant from the use of the *improvement* claimed in said patent, as distinguished from that which the defendant had a right to use, or that for the use of which the defendant is not accountable in the other action.

3. Because the complainant has not proved any data from which it can be shown that the defendant profited or saved anything.

All of which is respectfully submitted.

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